APRIL 1949 1/6

he
GEOGRAPHICAL
MAGAZINE

RING
NUMBER

ETH HUXLEY
bo and his
ple

SMYTHE
Clouded Scene

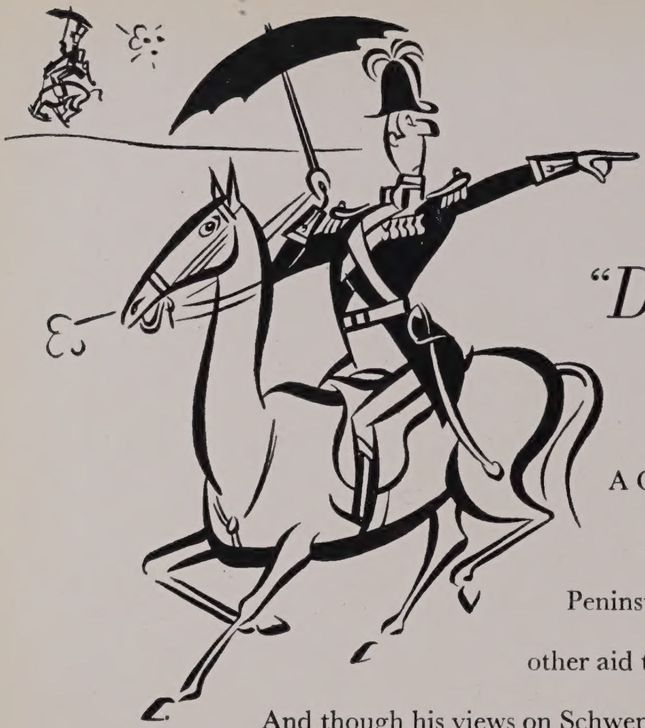
OR LLOYD
Greenland?

ETH WILLIAMS
vest of Oil

OUGLAS BROWN
port Breding

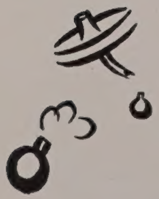
ETH G. GRUBB
otanist
he Amazon

ALL CLASSES OF INSURANCE TRANSACTED
CAR & GENERAL INSURANCE CORPORATION, LTD.
83 PALL MALL, LONDON, S.W.1



"Detail, Sir, Detail!"

A General who permitted his cavalry to ride about with umbrellas during the Peninsular campaign would not overlook any other aid to their well-being—and his own! And though his views on Schweppes have yet to be unearthed by some earnest researcher in the by-ways of Wellingtoniana, the popularity these lordly table waters enjoyed with gentlemen of the Iron Duke's generation and station is clearly written in our records. Schweppes bubble reputation has been built up over more than a century and a half. Every bottle lowered by Peer, Landed Gentleman and mere Commercial plutocrat added to its fame and confirmed the ever-growing certainty among persons of perspicacity and palate that the mere fizz of the imitators was nothing.



SCHWEPPERVESCENCE, Sir . . .

thirst things first!

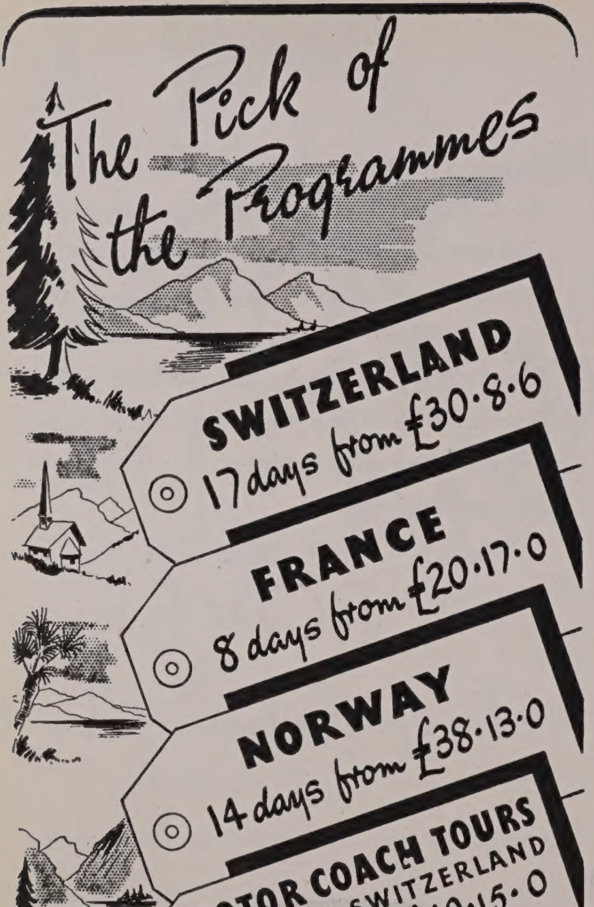
No one who drives the Rover Sixty or Seventy Five for the first time can easily forget the experience. Here are all the traditional smoothness and refinements so long associated with Rover cars, plus a new responsiveness which gives a fresh meaning to the words "One of Britain's Fine Cars." Yet despite their brilliant performance and remarkable flexibility these new Rover engines demand less fuel than their predecessors. Such is the result of high quality design.

ROVER

One of Britain's Fine Cars

THE ROVER COMPANY LTD., SOLIHULL, BIRMINGHAM AND DEVONSHIRE HOUSE, LONDON

CVS-114



The Pick of the Programmes

SWITZERLAND
17 days from £30·8·6

FRANCE
8 days from £20·17·0

NORWAY
14 days from £38·13·0

MOTOR COACH TOURS
FRANCE & SWITZERLAND
14 days from £49·15·0

1500 HOLIDAYS IN THE
BRITISH ISLES
Seaside & Inland resorts

WRITE FOR FREE COPY
of programme covering the
country or holiday in which you are interested

COOK'S
WORLD TRAVEL SERVICE
THOS. COOK & SON, LTD.,
Dept. HOL/14/AF. Berkeley Street. London, W.1, or branches.
Or any office of Dean & Dawson Ltd

Everyone has someone worth saving for

Invest in
NATIONAL SAVINGS
NATIONAL SAVINGS CERTIFICATES DEFENCE BONDS
POST OFFICE & TRUSTEE SAVINGS BANKS

Issued by the National Savings Committee

'It was a heart-breaking sight'

'*I rushed upstairs and found the tank had burst.* Carpets, bedding, armchairs, piano — everything we had was soaked and spoiled. My heart sank at the thou of the cost of putting it all right ag What a blessing we were insured! ' General' paid the claim—under the te of our Householders' Comprehensive Po — in full and without question. An inv ment reckoned in shillings turned out be the saving of our home.'

Peace of mind costs very little

£600 cover on household goods for only 30/- pr ium, against fire, burglary, flood and more tha other risks — is just an example of what the 'Gen Householders' Comprehensive Policy offers Plus 100% No-Claim Bonus, every sixth year. out more — while it's in your mind. Write to

General
ACCIDENT FIRE & LIFE ASSURANCE CORPORATION LTD.
H.C. Department
General Buildings, Perth, Scotland.

FAMOUS FOR ALL CLASSES OF INSURAN

Bridport Breding

by ROBERT DOUGLAS BROWN

One hundred and forty miles south-west of London, pocketed in an arc of green hills beside the English Channel, lies the homely country town of Bridport, undistinguished in appearance or history and relatively unknown to the thousands who pass through it on their way to the holiday playgrounds of Devon and Cornwall.

This town, focal point of the rural western part of the county of Dorset, is also Britain's most important centre of the specialized industry of rope, twine and net manufacture. So far back into history stretches the pre-eminence of Bridport in this trade that today its inhabitants speak simply and proudly of "the Bridport Industry". "To be stabbed with a Bridport dagger"—meaning to be hanged by a rope—is an euphemism used by generations of Dorset folk since the days when Bridport supplied executioners' ropes to the county gaol at Dorchester.

No one is able to say how, or when, or why this industry developed in Bridport. The earliest record of it is dated 1213: an instruction written by King John to the High Sheriff of Dorset that Bridport shall supply for the British Navy ropes, cables and "twisted yarns for cordage and ballistae". For centuries afterwards the fleet could not have put to sea without the supplies from Bridport.

There were important factors favouring the development of the industry in Bridport, but all were equally present in some other parts of Britain. It seems, therefore, that the town simply stole a march on its potential competitors!

West Dorset is suitable for flax and hemp, raw materials for the industry, and big crops were grown until about a century ago. First hemp, and later flax, were abandoned and by 1900 most of Bridport's supplies were being imported from Russia or Italy. During each of the two world wars flax-growing was revived and it looks as if the farmers will keep a certain acreage under flax in the future if the government maintains the subsidies it is paying.

Today, however, ninety per cent of raw materials for the trade is imported. Most of the hemp—and the best of it—comes from Italy, the balance being made up from the Balkans and Chile (where it is grown from Italian seed). Russian hemp, once considered the best in the world, has scarcely been seen in Britain since 1917. Flax is imported from Northern Ireland, Canada, the Baltic and Belgium. Cotton comes from America and Egypt, with lesser quantities from India. The industry also uses a little silk.

Apart from the one-time advantage of a central position in a flax-growing district, Bridport has a mild, moist climate, which suits an industry of this kind. It is situated, too, on a good fishing coast, though there are no large fishing ports nearby. And, until about sixty years ago, there was a certain amount of shipbuilding at West Bay, the small port a mile and a half from Bridport itself. In the 18th and 19th centuries a good many small warships were built there.

In its earliest days the Bridport industry was concerned only with ropes and twines and the work was done in a few small spinning factories. Local fishermen bought supplies with which they and their families made their own nets in their homes. As better communications opened up wider markets Bridport went a stage further and manufactured nets of every type. Most of them were made by villagers in their cottages. The "netmaker" ran a small office from which he sent out quantities of twine each week and to which the finished nets were returned.

Few homes in the district were not engaged in the trade. Children of both sexes were taught the craft ("breding", or "braiding") in school. Agricultural workers looked on twine work as a blessing during those seasons when they could not earn a living on the land.

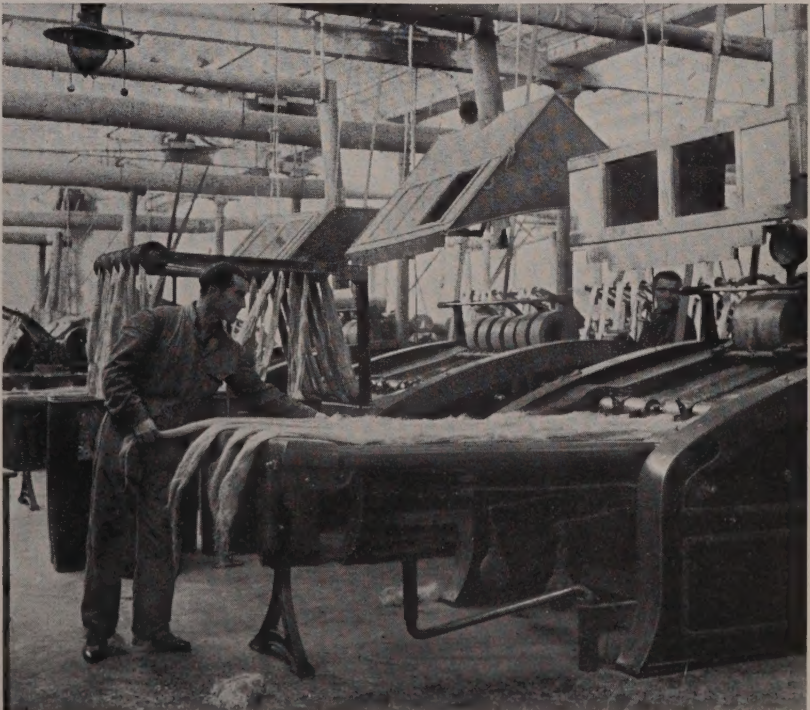
Today most Bridport nets are made by machines, capable of making up to 8000 knots a minute. But these have not yet ousted the craftsman, for trawls are still hand-made, as are many other nets requiring varied size of mesh or of irregular shape (for example, billiard-table pockets). "Outworkers" are keeping alive the old cottage industry in towns and villages for twenty miles around Bridport, helped by a world demand the machines cannot nearly meet.

The big change-over in technique of production has taken place almost entirely during the present century. The power-operated looms came between 1900 and 1910. A long time before that there were hand-operated looms that, though slow and clumsy by

All photographs from C.O.I., Crown Copyright

(Above) *The tranquillity of a country lane reaches right up to the entrance of this Bridport spinning-mill. The town's natural charm has been unaffected by the growth of its specialized rope, twine and net manufacturing industry, of which flax and cotton are the raw materials. The treatment of flax is begun* (left) *when it is soaked, or "retted", a process by which the separate fibres are sealed together, while surplus wax is removed from the stalks' outer casing*

When the flax has been soaked it goes first to the factory sorting room. Girl workers (above), *wearing fingerless gloves to protect the palms of their hands, prepare it for passage through the machines.* (Right) *In the first of these, rollers draw the flax through a series of pins, or "gills", and it emerges as a continuous "sliver", or flat strip, ready for the spinning-mill. Hoods over the machines draw off the smaller fibres thrown up during this operation*



modern standards, achieved a considerable speed-up. Many of these were built in Bridport. In one factory I saw recently such a machine in use. It was believed to be about 150 years old and the worker who has operated it for the last thirty-six years said he thought it to be the first machine ever built locally. There are more of these old, hand-operated looms in the town than there are men with the knowledge to operate them; though they could still make a useful contribution to production they stand idle because youths are unwilling to learn what they believe to be a dead-end job.

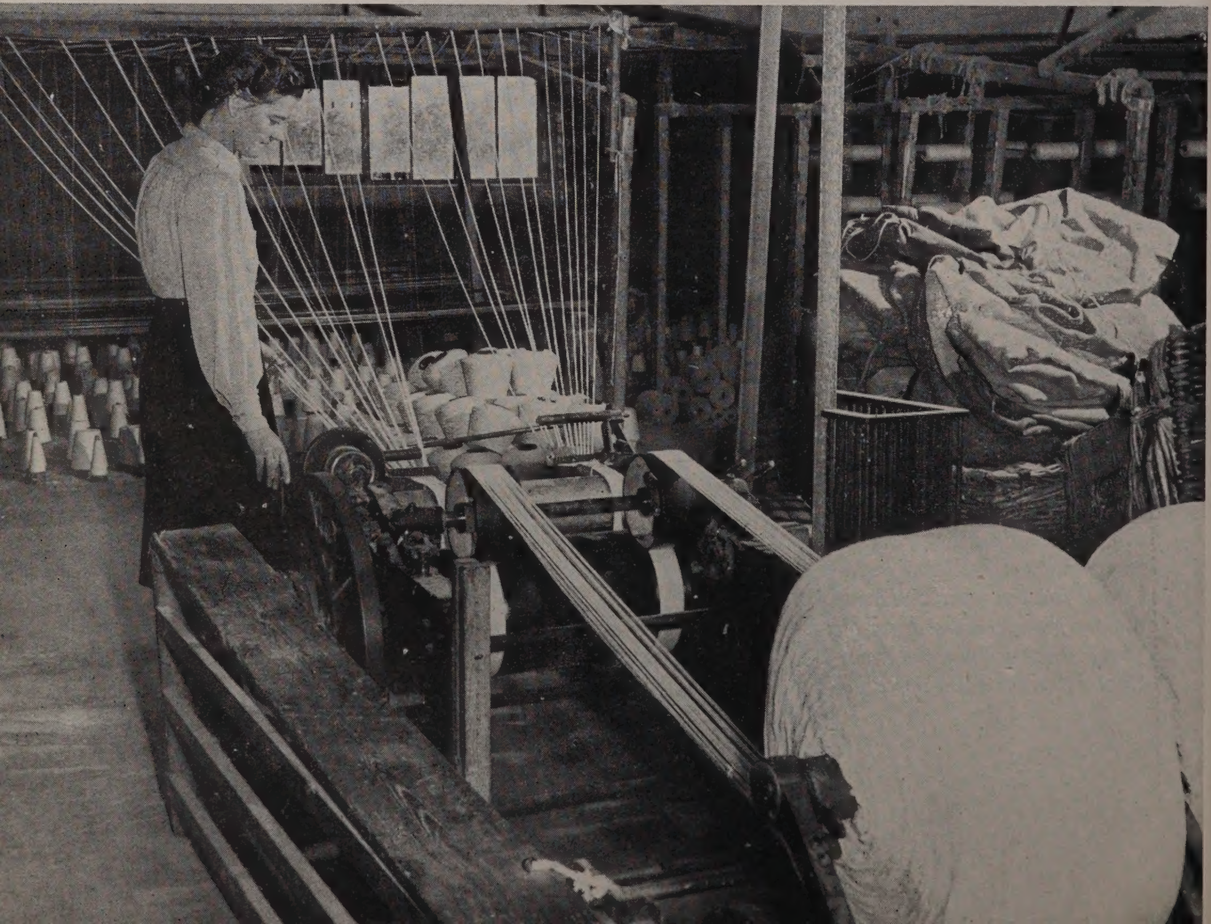
The variety of products of the Bridport industry is constantly extending. Sports equipment is an outstanding innovation of recent years (for fourteen years a Bridport firm held patents giving it sole right to manufacture nets for football goals). Cotton fishing netting is the most important product in volume, with agricultural and horticultural netting close behind. The latter includes an amazing list of items: bags for brussels sprouts, nets for peas and beans, rabbit nets, nets from which to feed horses and mules, nets for horses' ears and for calves' noses. There are many kinds of miscellaneous nets, of which that intended to prevent the baby climbing out of its cot is one example. And in addition there is, of course, the great output of lines, twine and rope.

During the war the industry went over entirely to production for the Services: camouflage nets, cordage for the balloon barrages cast around Britain's principal cities, lanyards, torpedo and other nets for the Admiralty.

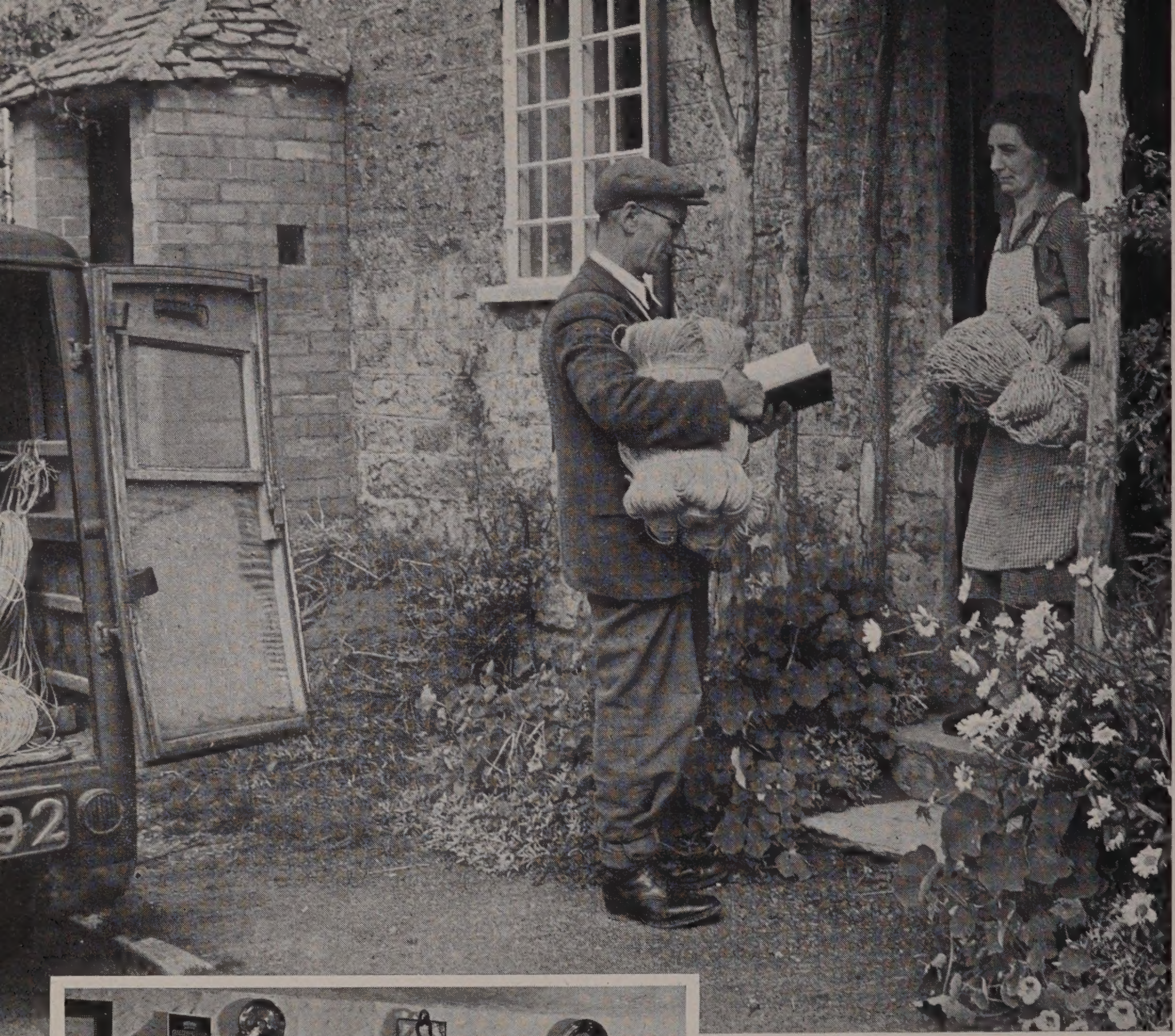
Today it is working in the new campaign—to increase exports; more than forty per cent of the industry's output is sold abroad. Bridport salesmen know the world market, for Bridport products were sold in every continent even before the first world war. For a time Japanese manufacturers took part of the market but today that competition has been removed.

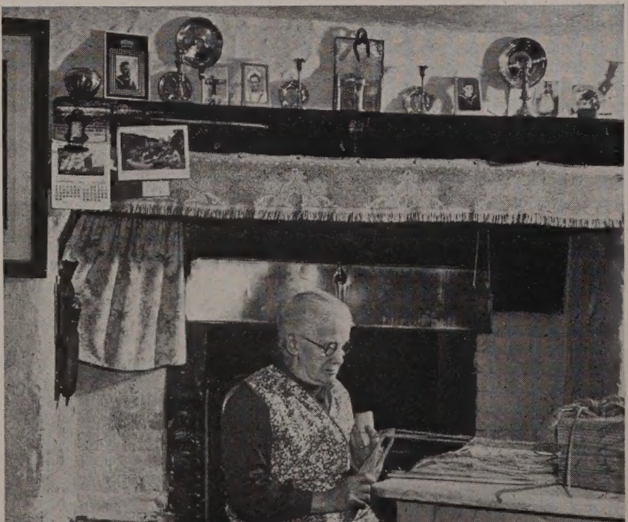
There are seven factories in Bridport, four in the Bridport Industries combine and three in the Joseph Gundry combine. Into each

Measured by volume, cotton fishing netting is Bridport's principal product. After being spun a large number of single yarns are wound onto one big roll, from which the lines for nets are made

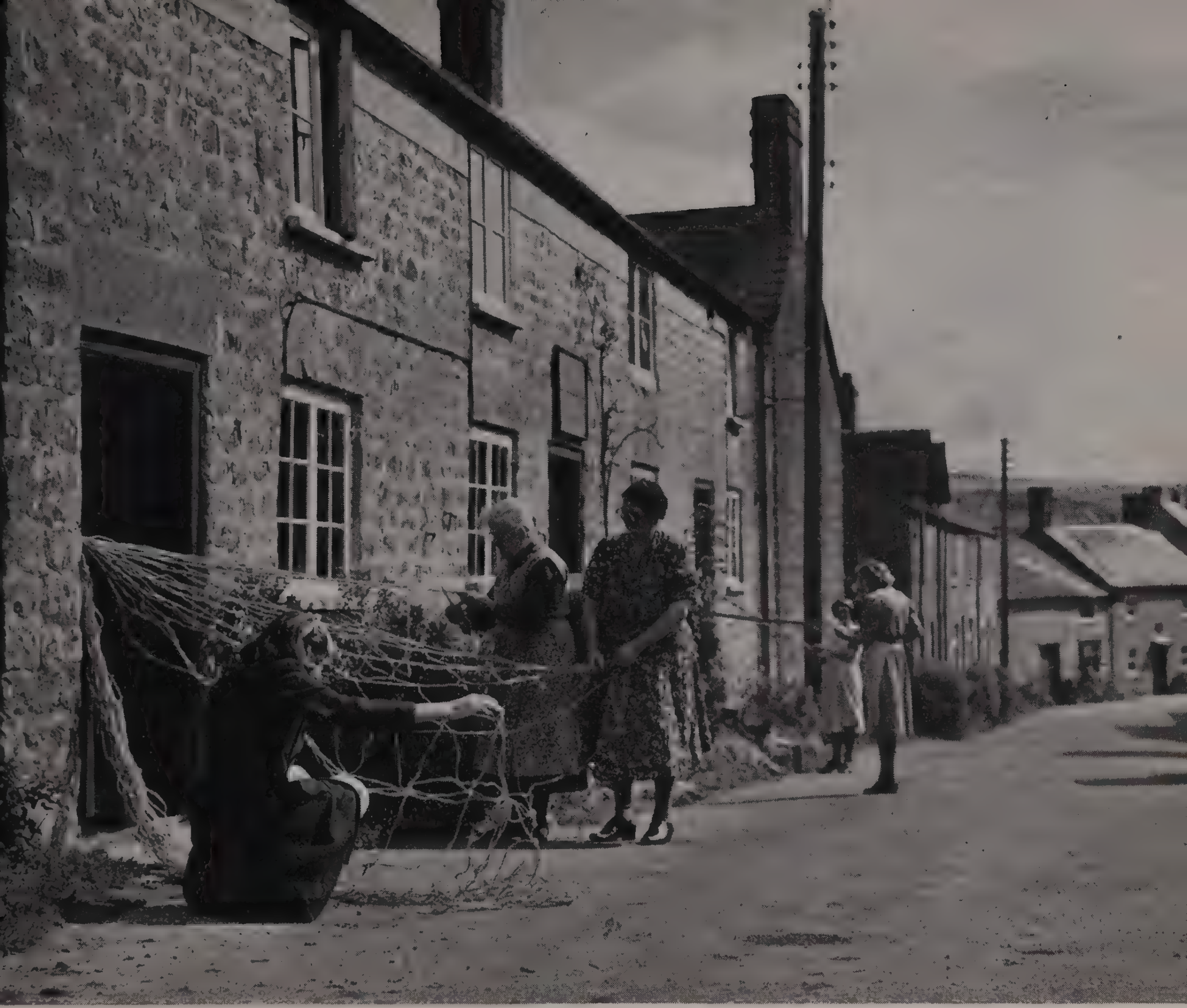


In the fitting room girls do the work which cannot be mechanized; trimming nets of irregular shape or design and fitting corks and lead weights. This net, of fine cotton, is destined for British Columbia





(Above) "*Contact men*" *tour villages and hamlets for twenty miles around Bridport, delivering twine to cottagers and collecting nets braided since their previous calls. For some kinds of net-making no satisfactory machines have been devised, and* "*outworkers*" *get as much employment as they want. Most of them learned to braid before they could read or write. They use needles made of alder, often passed down from generation to generation until they are highly polished with wear.* (Left) *This old lady started braiding when she was seven, more than seventy years ago*



In the summer months braiding is often done outside the cottage doors; it is not unusual to see three generations of one family working as a team while chatting to neighbours similarly engaged

of them pours a never-ending supply of raw materials, from Europe, Asia and America. From each of them goes out a record-breaking stream of finished goods. On the bales one can read the names of cities and ports in every part of the world.

The factory is a place of unexpected movement and colour. Batteries of machines strand the raw materials; others spin them into twine. As dozens of gleaming strands pour down from the whirling spools above, one sees the effect of a miniature waterfall. The spooled twine is then ready for the looms, of which there are usually a dozen or more of different types to handle different kinds and strengths of twine. From the looms, the netting goes to a stretching room where, after being hung for any knotting faults to be corrected by hand, it is subjected to stresses of up to ten tons. Nets of irregular shape go to a special fitting room, where a dozen girls deftly perform the work the machines still cannot do satisfactorily.

Dyeing and tarring are skilled processes. From vats of dye, arranged together in one section of the factory, net and twine emerges in many colours: bright greens, blues, browns and reds. Some retain their natural colour throughout; others again are tarred. For this, the tar must be maintained at an exact temperature throughout; otherwise, no matter what the life of the net, it will never dry properly.

In every department of every factory in this small town one can see men and women still working with the knowledge and skill acquired by themselves and their ancestors during centuries of craft work.

The Clouded Scene

by F. S. SMYTHE

MAN is born into a wonderful world and his span of life in it is little enough to enable him to appreciate it. His Creator has provided him with conditions in which he is able to live and enjoy living, and placed scenes of grandeur and beauty before his eyes to elevate him in mind and spirit. Beneath him is the rich earth and its green cover of growing things. Around him stretch oceans, plains, hills and mountains, and above him he peers questing into infinite space whence shine other worlds at untold and uncomprehended distances. But something more had to be prepared for him, a grandeur and a beauty as great as any, the atmosphere.

> Between their burning light,—their deep vacuity, and man, as between the earth's gloom of iron substance, and man, a veil had to be spread of intermediate being;—which should appease the unendurable glory to the level of human feebleness, and sign the changeless motion of the heavens with a semblance of human vicissitude.
>
> Between the earth and man arose the leaf. Between the heaven and man came the cloud. His life being partly as the falling leaf, and partly as the flying vapour.

Thus wrote John Ruskin in his opening chapter on the beauty of clouds in *Modern Painters*.

The first question he propounds is, why do clouds float and why do some cling to the earth in the early morning when they are apparently weightier than the towering columns of clouds which fill the sky on a thundery summer afternoon, clouds charged with untold tons of water-soaked vapour ready to condense and fall as rain, hail or snow at any moment? How can clouds float at all when the lightest thistle-down falls to earth, and a balloon can only be suspended by a gas lighter than air?

This question has not been entirely solved even today, as the following extract from a book on meteorology will show:—

> When the temperature of the air as a whole is reduced below the saturation temperature, or dew point, the excess vapour is condensed into minute droplets of water or, if the temperature is low enough, particles of ice; in this way a cloud is formed. In such broad terms the process seems straightforward enough, but there are many hidden difficulties which give rise to a quantity of theoretical and experimental work of great scientific interest.

In other words scientists cannot yet answer the questions Ruskin asked nearly a hundred years ago.

It would be a dull world which had every mystery stripped from it, and the weather reduced to scientific formulae. The charm of clouds and weather is enhanced because we cannot control or adequately predict either, and what goes on above us in the sky is a matter of never-failing stimulation and wonder.

The Englishman may grumble at his fickle climate but he realizes that the ever-changing cloud patterns above him are a background to his life of which he can never tire.

Clouds have formed a similar background to the literature and poetry of the past. Shakespeare in *Antony and Cleopatra* writes of those vast columns of cumulus that dominate the landscape on a summer afternoon or are silhouetted darkly against the red sky of sunset:

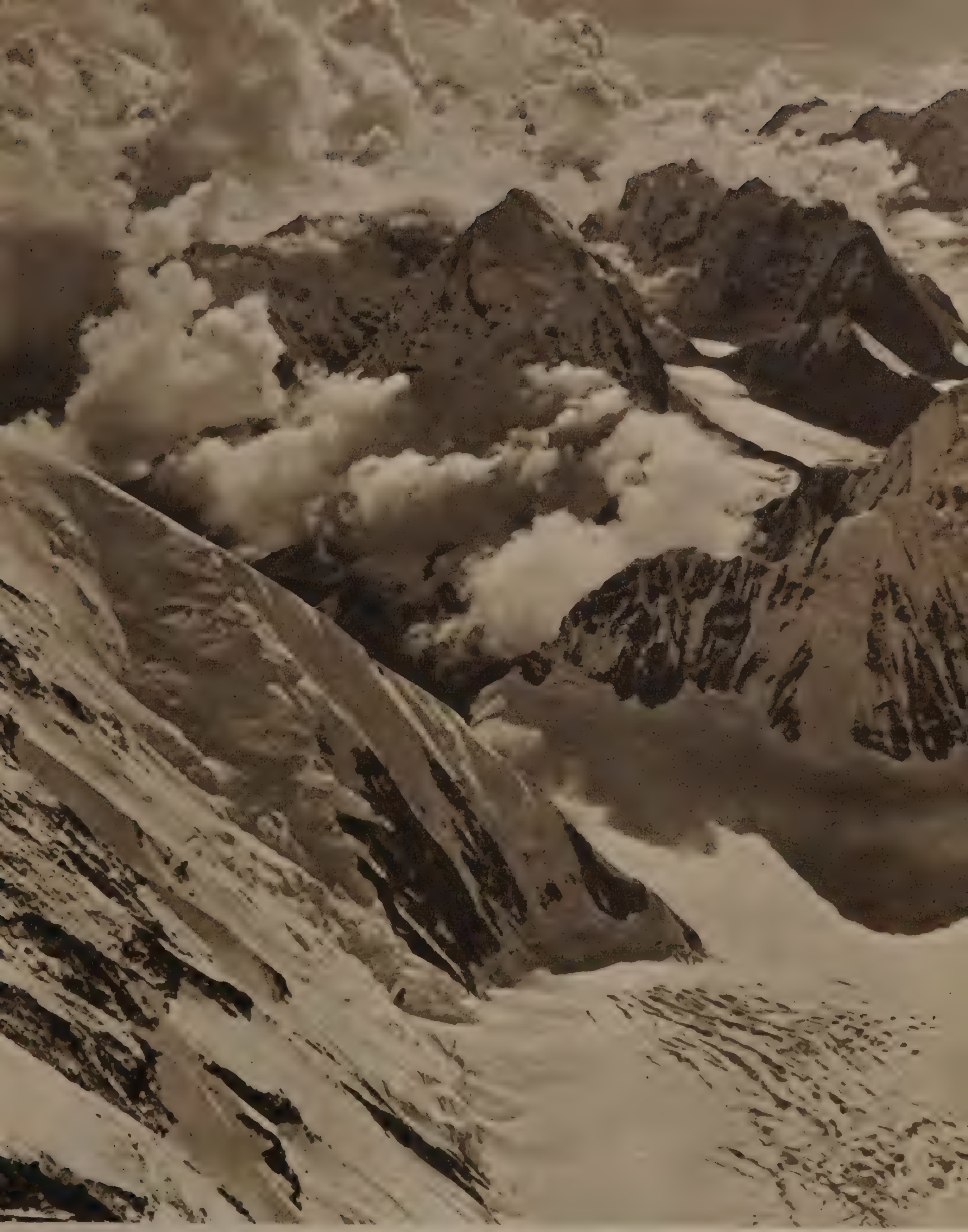
> Sometimes we see a cloud that's dragonish;
> A vapour sometime like a bear or lion,
> A tower'd citadel, a pendant rock,
> A forked mountain, or blue promontory
> With trees upon't.

Then by way of contrast with the sonorous verse of Shakespeare and prose of Ruskin there is Oscar Wilde writing of himself as he sits sadly in his cell at Reading Gaol:—

> I never saw a man who looked
> With such a wistful eye
> Upon that little tent of blue
> Which prisoners call the sky,
> And at every wandering cloud that trailed
> Its ravelled fleeces by.

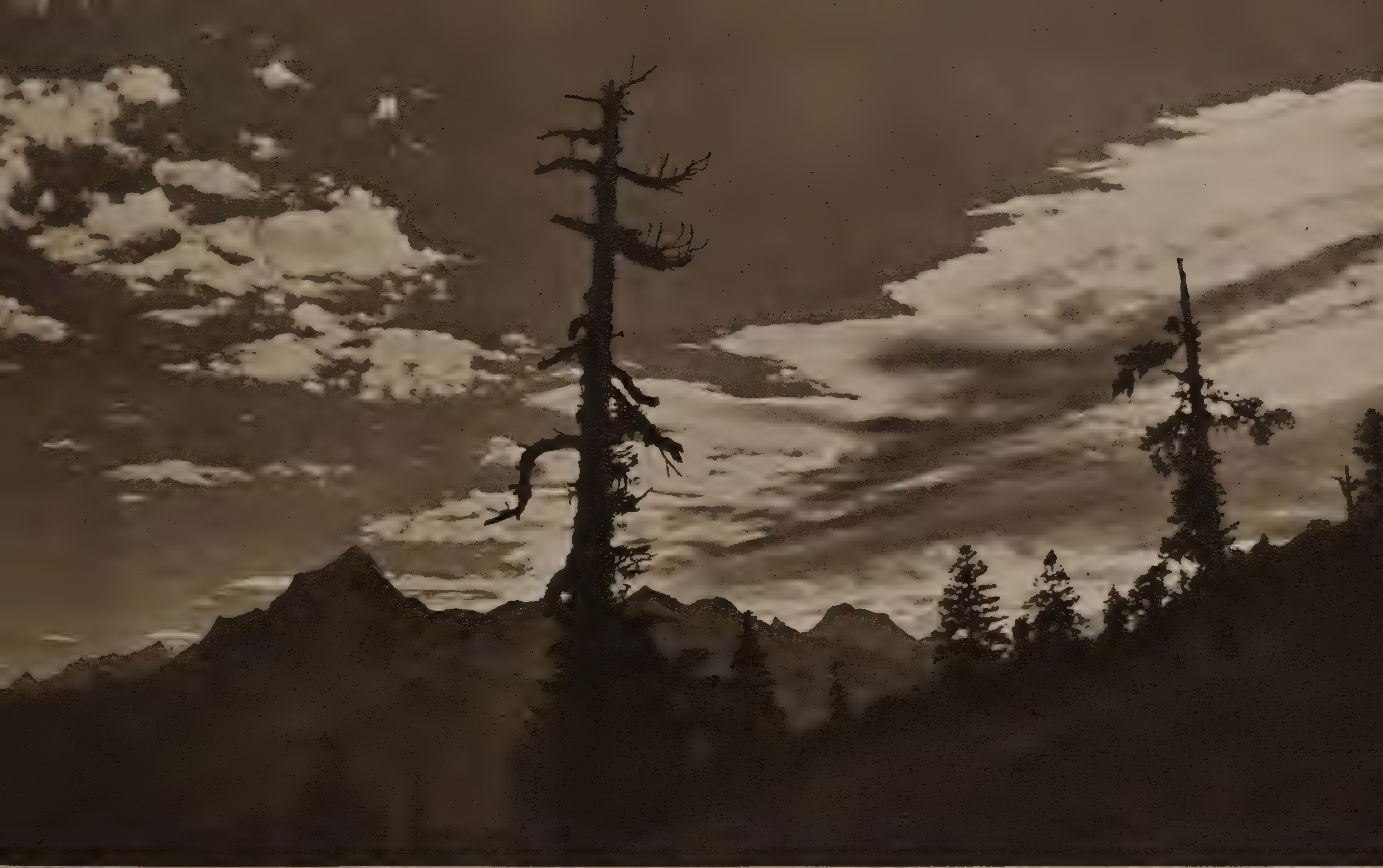
Then there was the little cloud of the Bible which rose from the sea no bigger than a man's hand, the forerunner of a storm in which "the heaven was black with clouds and wind, and there was a great rain".

Clouds do more than bring rain and fertility to the earth, they bring beauty to every scene. What landscape artist could do without them? In the pictures of Constable the clouds are the perfect complement of his genius for landscape painting; their great billows, poised above the level vistas of Norfolk and Suffolk, lend depth, distance and substance to the scene, they balance with their glowing folds the green folds of earth beneath, they invest the landscape with subtle colourings and gleams and shadows

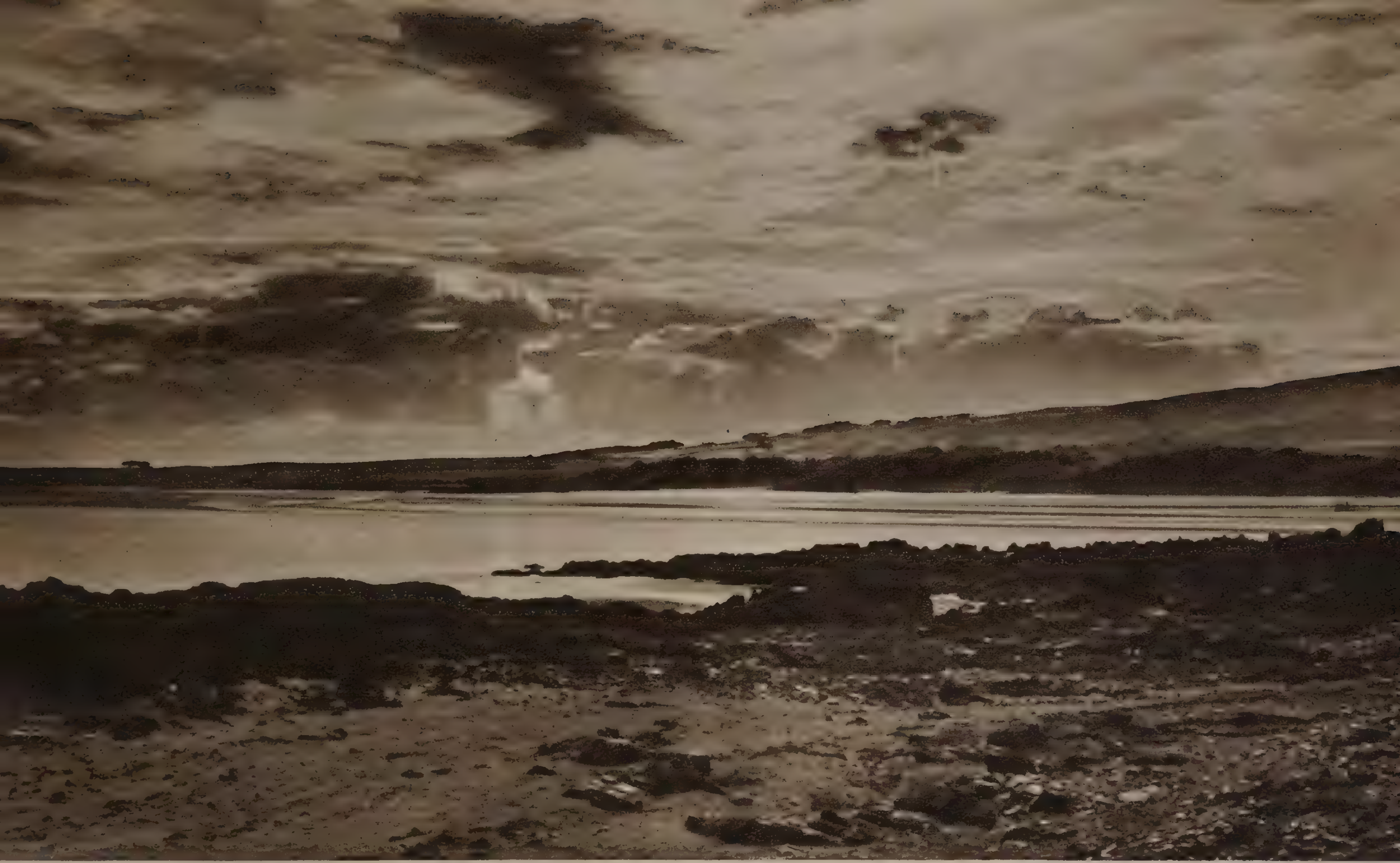


All photographs by the Author

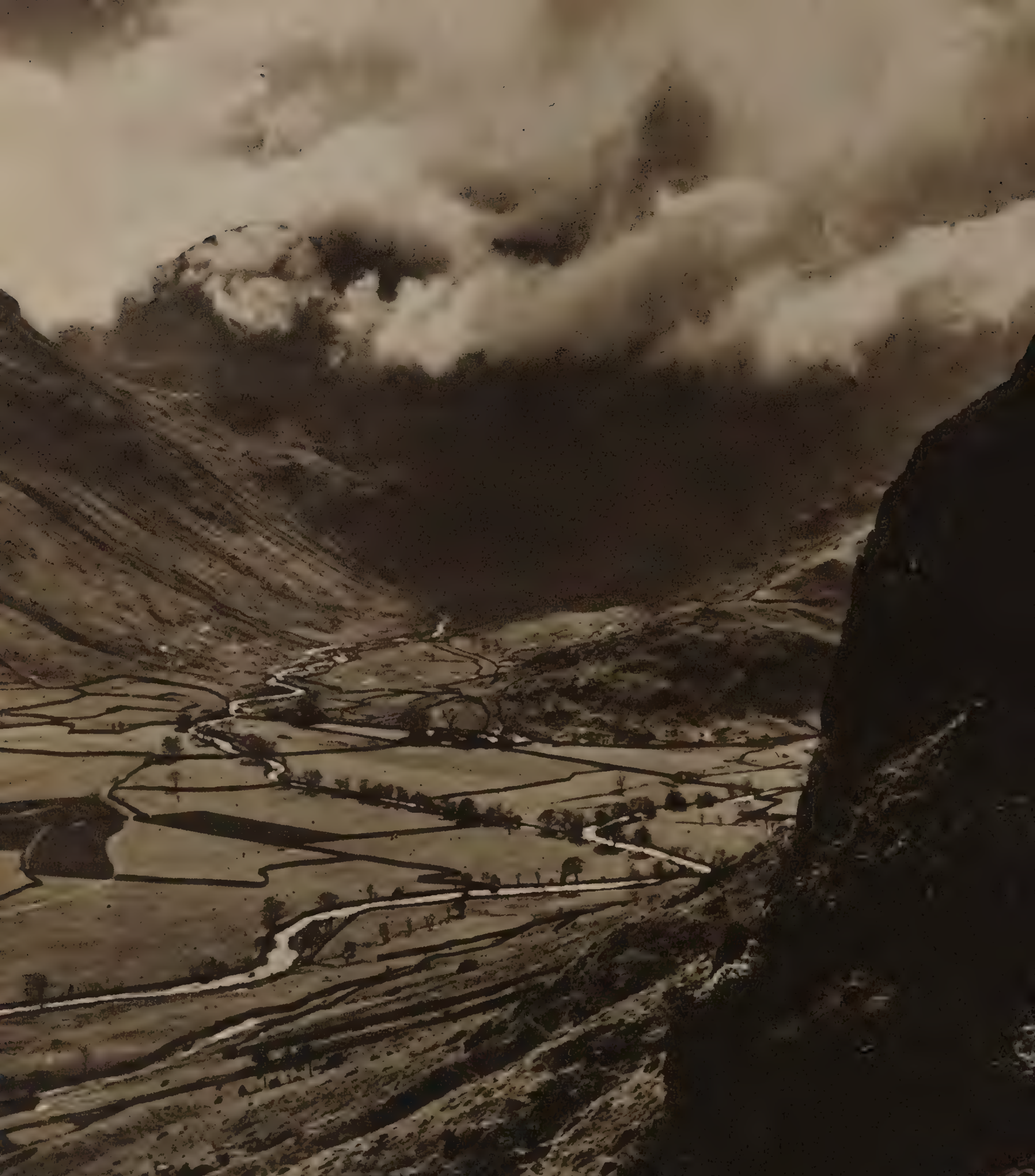
Photographed from a height of 25,000 feet on Mount Everest, monsoon clouds gather along the frontier of Nepal and Tibet. Below is the Rongbuk glacier, some of the crevasses of which could engulf a battleship



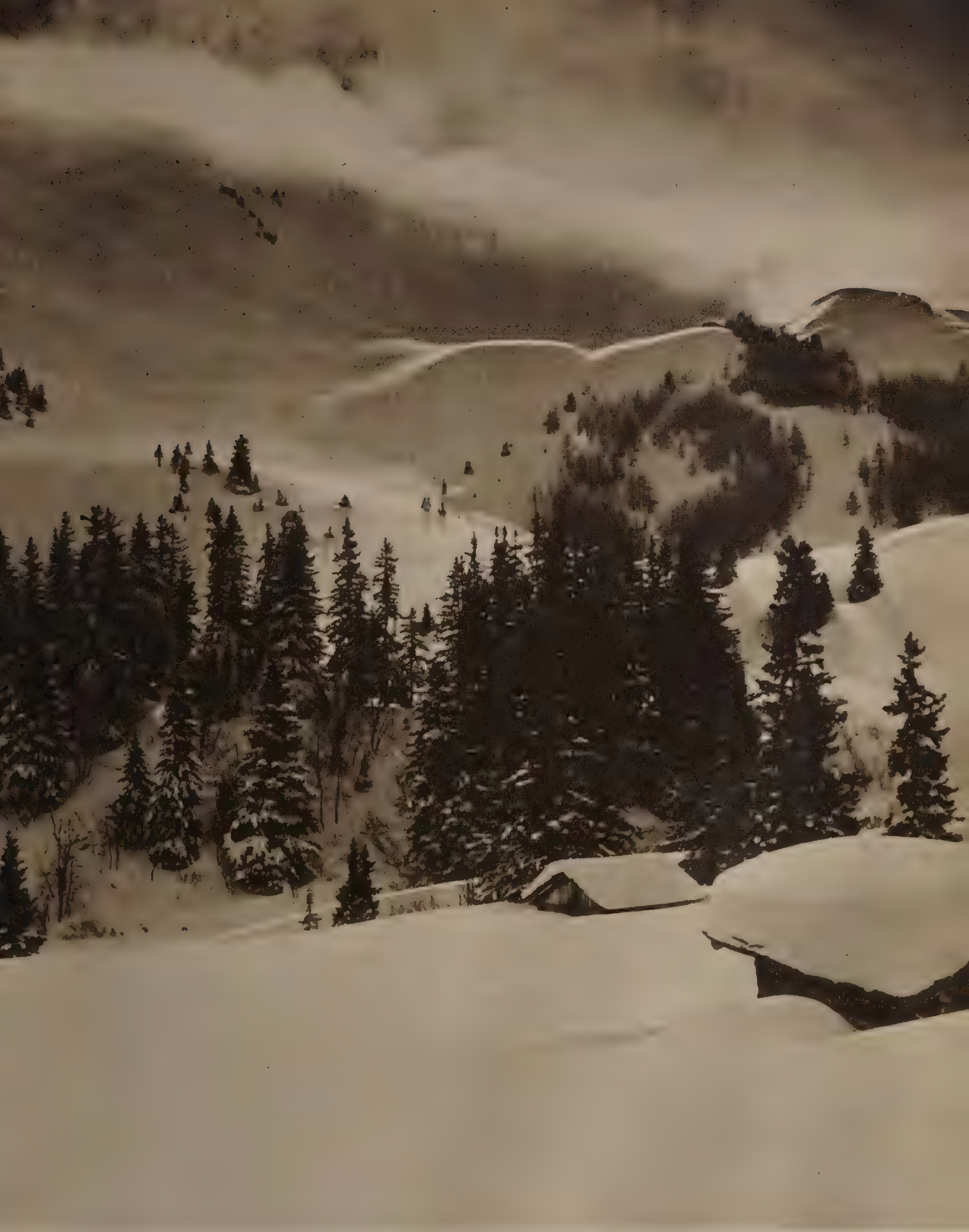
Light stratus clouds, presaging fine weather, are lit by the rising sun near the 12,000-foot Kuari pass in the Garhwal Himalayas; these clouds are at least 25,000 feet high, for they are far above the 23,184-foot peak of Dunagiri, which may be seen to the left



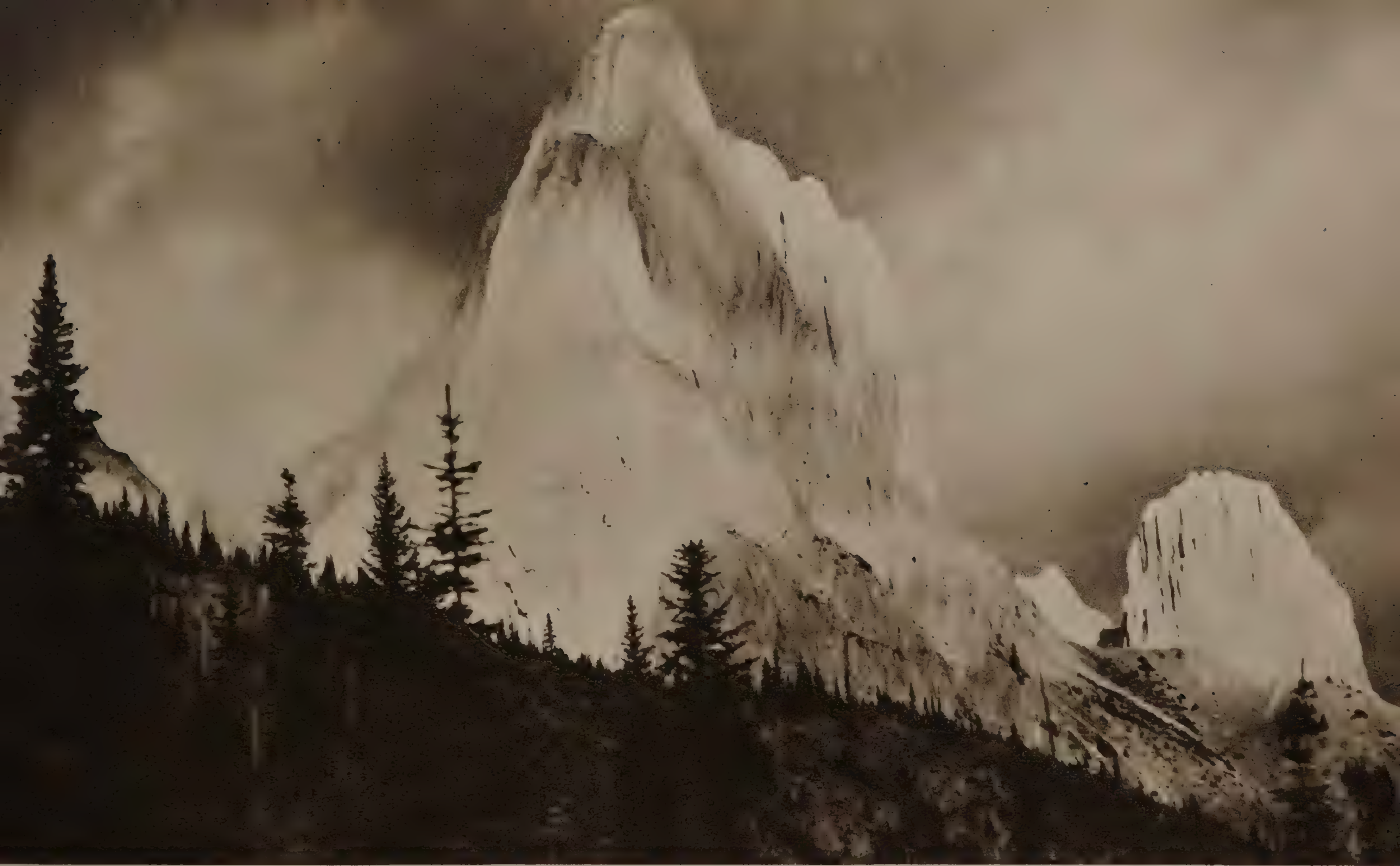
An August-evening sky over Kirkcudbright Bay. It appeared during a period when east Scotland was being devastated by torrential rain; there had been heavy falls during the day, but in the late afternoon the clouds broke to reveal this glorious but ominous scene



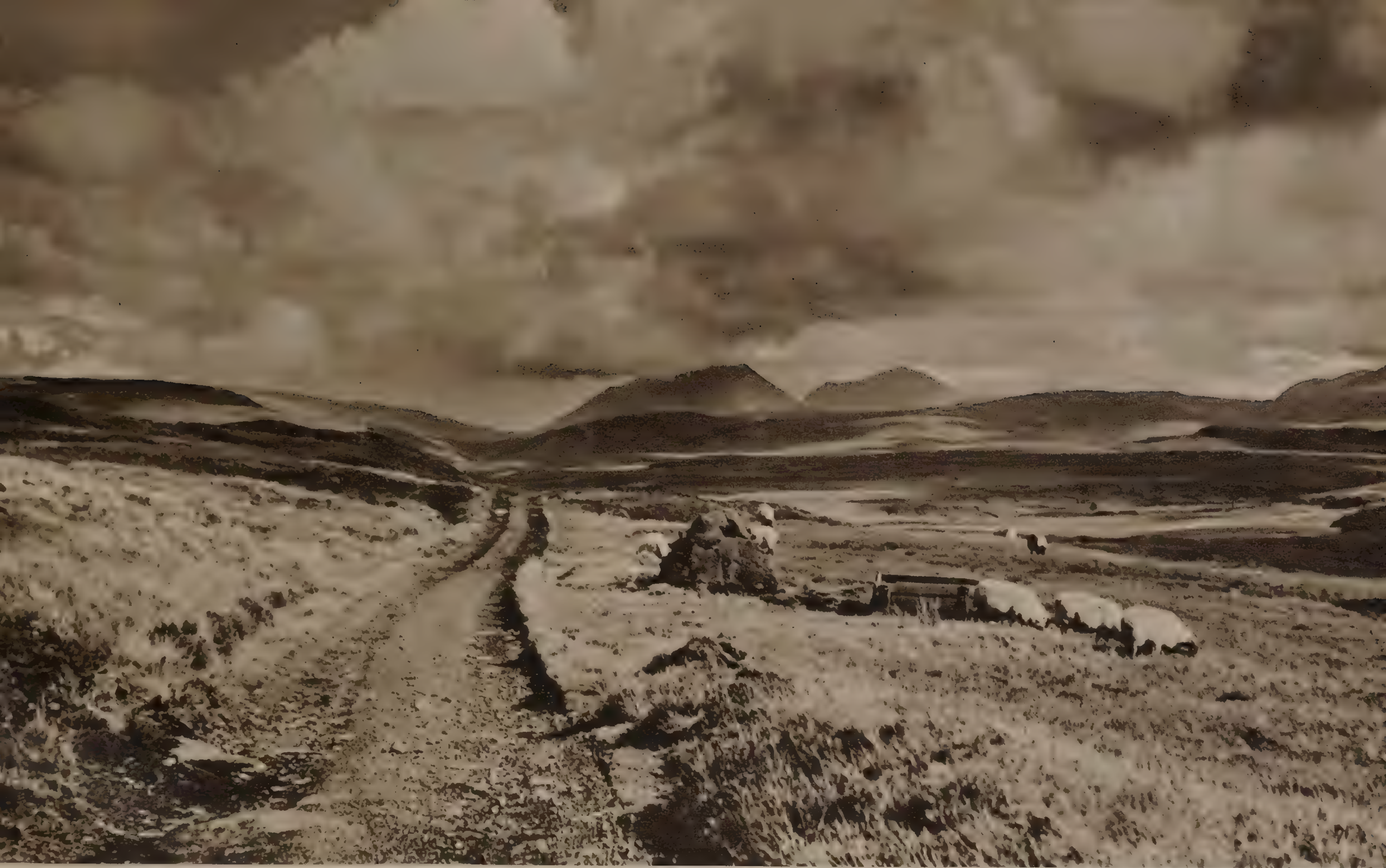
Clouds not only contribute to the beauty of the British hill landscape: they enhance its scale and grandeur. After morning rain at Langdale in the Lake District the mists cleared and sunlight gleamed on hill and valley



Frosty mists formed overnight in the valleys round Adelboden, Switzerland, but when the sun rose it quickly dissolved them, revealing glimpses of the mountains and a beautiful interplay of light and shadow on the snow



Mount Louis, a shapely dolomite peak near Banff in the Canadian Rockies. One morning the author set out to climb it, and as he turned a corner of the trail this was the dramatic view it presented; its peaks, crowned with sunshine, melting into shadow, loomed ghostlike amid the shifting mists



A vista of the Isle of Skye, looking across the moors near Carbost to the Red Hills of Lord Macdonald's forest; the landscape is dappled with light and shade, as hosts of vast cumulus clouds sweep across it on the wings of a strong wind to drench the hills with thundery showers of hail and rain

No countryside surpasses that of springtime England: Loughrigg tarn near Ambleside, with its wild cherry blossoms set against silvery clouds and blue sky, provides one of many scenes that inspired the Lakeland poets revealing unsuspected beauties of form and outline.

The countryside is most beautiful in April and May, when the earth is robed in fresh spring green and the trees blossom against a blue ocean of sky where the cloud-galleons slip along with white billowing sails.

Then there are the summer afternoons when massive cumulus clouds are piled upwards on the hot air-currents rising from the heated earth, cathedrals and citadels of vapour. Denser and denser they grow and there is a lurid light on their topmost crests contrasting vividly with the deepening shadows in their cavernous folds beneath. The clouds massing together evolve an enormous anvil-shaped cloud known as cumulonimbus which extends far across the sky. On this Vulcan forges the lightning-bolts with which the cloud will later strike when it has grown large enough.

The most extraordinary thunder-cloud I ever saw was like a vast and even wall spanning the sky. It mounted the sky still keeping this formation and flaming the while with a massive and continuous discharge of lightning and emitting a bellowing roar of thunder. With two friends I was climbing the south-west rock ridge of the Schreckhorn in Switzerland and could not have been in a more exposed position. We saw the clouds flow like ink across the plain of Bern to the Eiger a mile or two away and the lightning hit that mountain as though it would rift it asunder. Then it was swallowed up and the wall of inky cloud and its furious barrage of lightning-discharges rushed across at us.

We had just time to find a small ledge beneath an overhang about twenty feet below the ridge when the storm was upon us. One after another its discharges struck the ridge above and twice masses of rock were split off and fell to either side of us. When lightning strikes near at hand it sounds like a bursting bomb.

An hour later when the lightning had ceased we descended the ridge as quickly as we could over hail- and snow-covered rocks, but as we were turning off to descend a gully another and equally violent storm arrived. I was stunned by lightning and this delayed the party several minutes. During this delay a large fall of rocks dislodged by lightning high up the mountain descended over the place where we would have been had I not delayed the party.

It took us eight hours to descend through a hurricane and blizzard and when we reached the glacier and safety it was a wonder to all of us that we were still alive.

The mountaineer who studies clouds can often tell the trend of the weather. If the only clouds visible in the morning are filling the depths of the valleys the day is likely to be fine, but if in addition there are other and higher clouds above the mountains then it will probably be wet and stormy.

The sunset the evening before the Schreckhorn storm was one of the most brilliant and colourful I have ever seen. Beware of such sunsets when you are climbing mountains.

Do not be caught as I was once by the Föhn wind on steep and dangerous snow slopes. If when ski-ing in the Alps you see clouds crowding out of the south in the early morning, assume it is the Föhn and avoid any long steep slopes and narrow valleys, for this super-heated wind will turn safe slopes into avalanchy ones in a matter of minutes.

Those are some forms of mountain cloud. Another is the great plume of flowing mist and snow that makes Everest such a magnificent spectacle. This is due to the cold northwest wind of Tibet rushing across the mountain and meeting a current of warmer air rising from the hot moist valleys of Nepal on the south side. It is possible to be miles away to the south-east of the mountain in a blizzard of ice particles and snow from its plume.

Some of the finest cloudscapes on earth are to be seen in Tibet during the monsoon season when the vast clouds born of the warm southern airs sail across the Himalayas like fleets of mid-aerial frigates and deposit their warm showers of rain on the dry and desolate plateau of Tibet, which thereupon blooms with all manner of flowers.

The clouds of hill and mountain, indeed, surpass any, as Ruskin wrote in a noble passage:

> There is no effect of sky possible in the lowlands which may not in equal perfection be seen among the hills. . . . The mere power of familiarity with the clouds, of walking with them and above them, alters and renders clear our whole conception of the baseless architecture of the sky; and for the beauty of it there is more in a single wreath of early cloud, pacing its way up an avenue of pines, or pausing among the points of their fringes, than in all the white heaps that filled the arched sky from one horizon to the other. And of the nobler cloud manifestations—the breaking of their troublous seas against the crags, their black spray sparkling with lightning; or the going forth of the morning along their pavements of moving marble, level-laid between dome and dome of snow—of these things there can be as little imagination or understanding in an inhabitant of the plains as of the scenery of another planet than his own.

Harvest of Oil

I. The Social Impact

by KENNETH WILLIAMS

In 1941 we published two articles by the late Mr Robert Byron in which he recounted the history of man's use of mineral oil and described the modern oil industry in its technical aspects. Mr Kenneth Williams, who has been specializing in this subject and in Middle Eastern affairs for twenty-five years, now surveys for us the latest developments as regards the social impact of oil on the lands where it is found and the application of scientific research to its problems

In both old and new lands, in territories in which successive civilizations have risen and fallen, as in territories innocent of the finer aspects of the human spirit, the search for petroleum continues. For Western, or scientific, civilization demands petroleum, and both Old and New Worlds are being ceaselessly examined to maintain and increase the supply. It is a curious fact that the impact of the discovery of oil has in recent years been most deeply felt by two areas that for some centuries had been left aside from the main stream of material progress—the Caribbean and the Middle East. In those two regions, oil production now comes second and third respectively only to the United States itself, and it is to them that the rest of the world must mainly look for the increase of supplies of oil which are required for the development of its industry and agriculture. Radical changes, both local and national, are being wrought in both regions, owing, at least in part, to the discovery of oil and to the wealth accruing to local populations or governments from its development; and it is with some of the local effects of that discovery and development that I propose primarily to deal in this article.

In a second article will be considered in more detail the importance of these and other oil-producing regions, relative to the present and future oil supplies of the world, and recent developments in finding and utilizing petroleum.

UNFAVOURABLE CONDITIONS

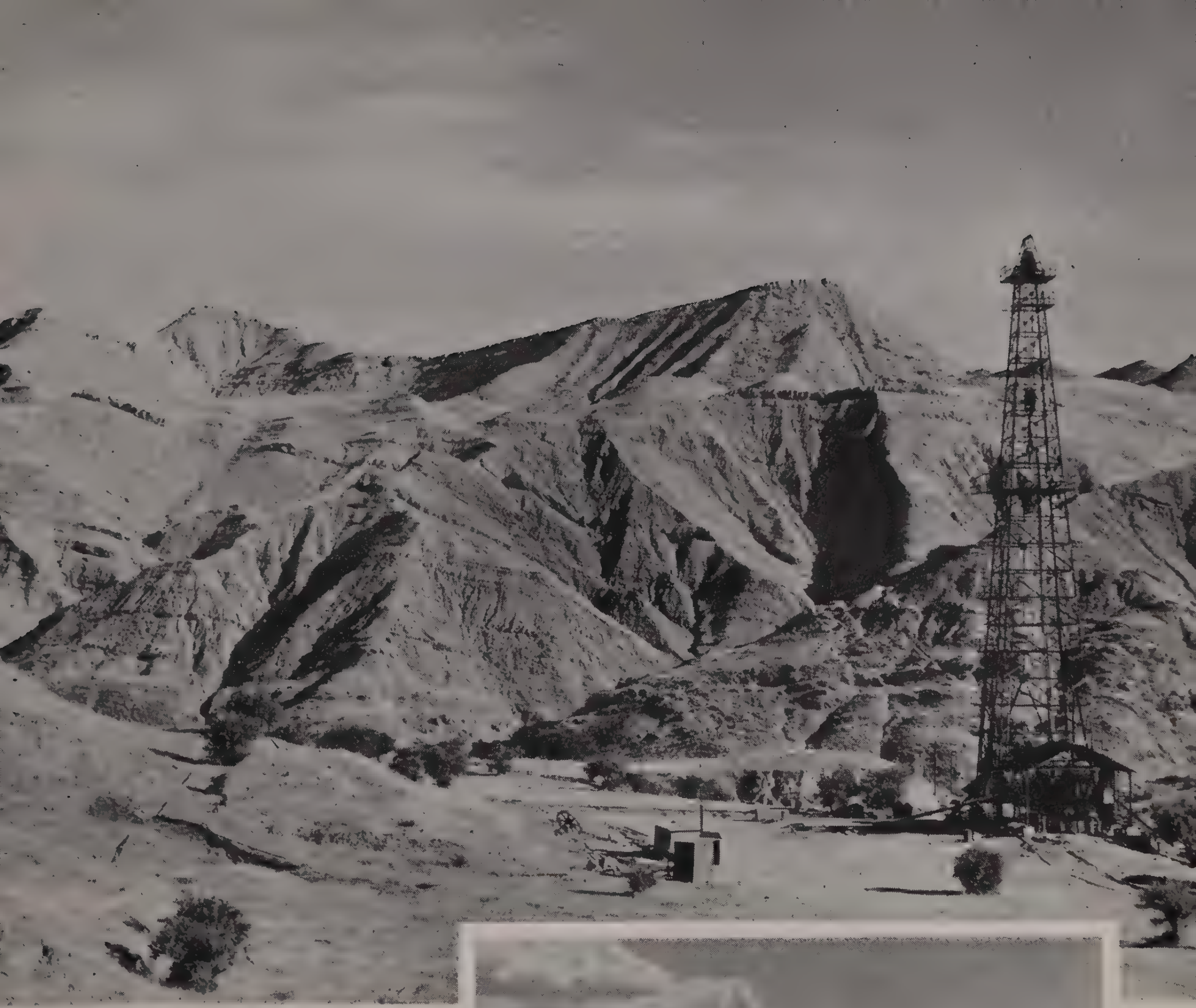
To the discovery of oil there is no magic key, no infallible guide. Often enough, indeed, it is found in places difficult of access, difficult, therefore, to provide with the necessary labour and materials, to say nothing of social amenities for that labour. It is necessary to note that, at the present time, with its 'shortages', the speed with which our urgent need for oil can be satisfied is limited by the rate at which it is possible for the human material and technical equipment (including houses, schools, hospitals, and so on) required for its production to be made available; and it is an indication of the resolve of the oil companies to provide adequate conditions for their workers that such difficulties are being steadily and in some instances brilliantly overcome.

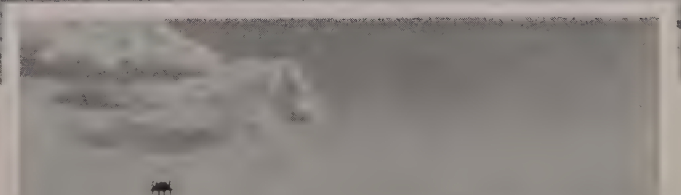
Take, as an example of the formidable nature of the difficulties with which oil pioneers have to contend, the story of the Anglo-Iranian Oil Company.

In 1901 William Knox D'Arcy, an Englishman who had made a fortune from the famous Mount Morgan gold mine in Australia, obtained a concession to search for and exploit oil in the whole of Iran, except for the five northern provinces. The site selected by D'Arcy's geologist was in western Iran, about a hundred miles north-east of Baghdad. The country was hilly and barren and intensely hot in summer. In this inaccessible spot two wells were successfully drilled, but the quantity of oil found was insufficient to justify the heavy cost of a pipe-line to seaboard. D'Arcy spent so much on these operations that he could not afford to continue unaided the search for oil. With the help of the Burmah Oil Company and the first Lord Strathcona he formed the Concessions Syndicate to carry on the work.

It was decided to transfer the scene of operations to what seemed a promising area some 300 miles to the south-east of the first test area and 150 north-east of the head of the Persian Gulf. Again, this region was inhospitable, even though it contained impressive remains of great irrigation works built sixteen hundred years earlier. The Syndicate began to drill not far from the present field of Haft Kel. Unsuccessful there, it moved some fifty miles to the north to a place called Maidan-i-Naftun, where there were copious oil seepages.

Or take, again, the history of Venezuelan





(Above) *The number one well at Lali, most recent of the Iranian oilfields. Some idea is given of the problems imposed by the surrounding terrain; such physical obstacles to the transport of stores and equipment are characteristic of those encountered in other oil-producing countries where wells are often in areas difficult of access. The use of aircraft has, however, greatly eased this situation.* (Right) *In western Venezuela yet another physical obstacle had to be overcome where the oilfields extended under Lake Maracaibo. Wells are drilled from derricks standing in water to a depth of sixty feet and extending several miles from shore*

All photographs, except one, from the Petroleum Information Bureau

Some governments insist on a percentage of oil employees being nationals; in practice the agreed minimum is usually exceeded. (Above) *Venezuelans installing new refinery equipment at Caripito.* (Below) *A Sudanese father and son are employed in an oil-company machine shop on Bahrain Island, where many races work together*

An employee of Saudi Arabia's Ras Tanura refinery (the construction of which was begun in 1944), who appears to enjoy the new way of life arising from the development of his country's natural resources. Before the erection of the refinery and surrounding township Ras Tanura was inhospitable desert and the local population both illiterate and without knowledge of modern technical equipment or Western methods. But the Arabs proved very adaptable and rapidly took advantage of the primary and technical education provided by an oil company; now many are employed in both skilled and unskilled occupations and live in conditions of comparative luxury

oil. In 1911, when an American company employed Ralph Arnold to investigate the entire mineral resources of the country, its geology was almost unknown. Arnold and his assistants found that on the official maps cities, roads, and other landmarks were frequently as much as thirty miles out of their true position. They themselves had to make a new survey, covering jungle, desert, and the foothills of the Andes to a height of several thousand feet. About twenty years ago, another party which surveyed the Oficina district of eastern Venezuela had to begin in Brazil and trek across country for four weeks to reach a place little more than a hundred miles from the Caribbean, but separated from it by mountains and dense jungle.

It was in spite of such difficulties as these that the Chairman of the Shell Company told his shareholders as long ago as 1915 that Venezuela was destined in due time to make a large addition to the world supply of oil. Today, Venezuela is, as related already, the second largest producing country, and is the largest exporter of petroleum and its products in the world. Oil production is carried on by a number of British and American companies, the largest of the former being those owned by Shell in association with Royal Dutch. This group has now an annual output in Venezuela exceeding 20,000,000 tons.

If the physical difficulties awaiting the oil pioneer are often formidable, the human difficulties may be scarcely less onerous. Local suspicion of the oilman's intentions was not unnatural, either among the tribesmen in the Persian Gulf region, or among the inhabitants of Venezuela. In the former, the tribesmen had to be mollified by payments and manifestations of interest in their general welfare; from certain Indian tribes in Venezuela oilmen had to protect themselves by barbed wire fencing and by covering their vehicles with heavy cloth impenetrable to arrows.

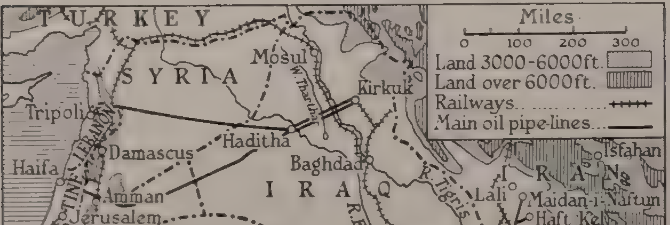
But oilmen had not only to overcome the initial suspicion or hostility of the local inhabitants, they had also to employ them. Here they were met by the fact that Arab, Persian, and Indian alike suffered from malnutrition, malaria, and epidemics of various kinds; they had, therefore, not only to earn their goodwill but also to protect them from the ravages of disease, and to increase their stamina.

VAST CAPITAL INVESTMENT

Enough has already been said to indicate that the search for and exploitation of oil requires huge capital outlay and replenishment. Even in the Iranian oilfield which has been mentioned, heavy expenditure threatened to bring operations to a close in the spring of 1908, when funds were all but exhausted. But in May of that year, oil was struck in abundance, and it was not long before the existence of an important field was proved. Consequently, the Syndicate was wound up, and D'Arcy's rights and obligations were transferred to a company specially formed for the purpose of developing this new field on a large scale. This new company was the Anglo-Persian Oil Company (the name was changed to Anglo-Iranian Oil Company in 1935). Scores of millions of pounds have been involved in this undertaking, to the benefit, incidentally, of the British Government, which holds a majority of the Ordinary Shares, but which in no sense controls the management of the Company.

Another example of the scale of capital which has to be provided for the operation of major oilfields is provided by the story of the Iraq Petroleum Company. For a number of years before the First World War, individuals and groups of British, German, American and other nationalities made strenuous efforts to obtain from the Ottoman Government an oil concession covering the two vilayets or provinces of Mosul and Baghdad, where there were thought to be good prospects of finding oil. Rivalry between all these would-be concessionaires resulted in stalemate. At length, therefore, they agreed to cooperate and formed the Turkish Petroleum Company (now known as the Iraq Petroleum Company) for the purpose of operating a concession if and when it could be obtained. In the summer of 1914 the Ottoman Government agreed to grant to this company a concession covering the two provinces, but war supervened before this promise could be fulfilled. When hostilities ceased the German holding (which had been forfeited) was transferred to a French company, and it was later agreed to admit certain American interests. In 1925 the Turkish Petroleum Company successfully negotiated a concession with the Iraq Government, and two years later the famous gusher at Kirkuk was struck. In 1934 this Kirkuk field, on the completion of its great pipe-line from Kirkuk to Haifa, in Palestine, and to Tripoli, in the Lebanon, entered the commercial production stage.

Meanwhile, in 1932, oil production had begun in Bahrain, where the concession is now held by the Standard Oil Company of California, the Texas Oil Company, Standard Oil Company (New Jersey), and Socony in the ratios 30: 30: 30: 10. This field has a relatively insignificant output compared with that of other Middle Eastern fields, but, besides having a marked effect on the local life of Bahrain, its success encouraged a search for oil, by the Standard of California, which originally obtained the Bahrain concession, in the neighbouring kingdom of Saudi Arabia. There, a major oilfield was discovered, and Aramco (Arabian-American Oil Company), comprising the four companies mentioned above, has already raised the production of Saudi Arabia to about 20,000,000 tons a year.

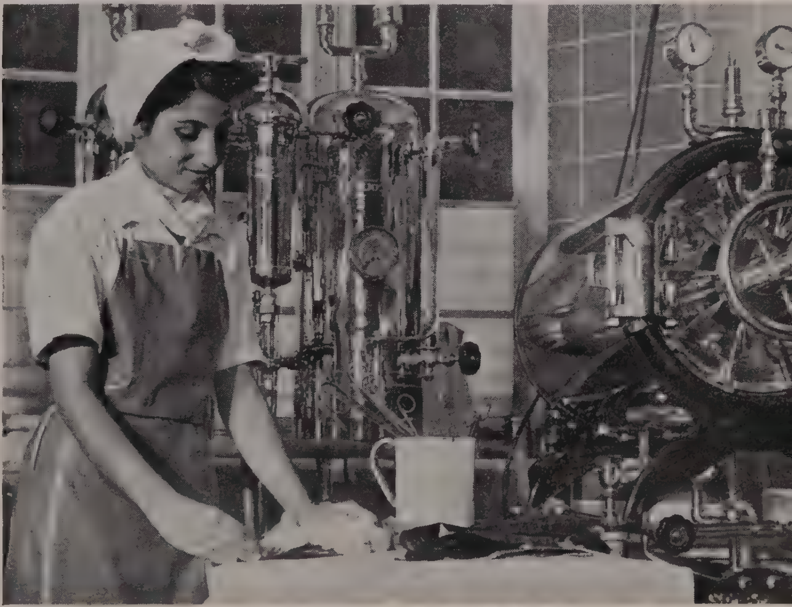


A. J. Thornton

Nor can one neglect the tremendous potentialities of the Kuwait oilfields, held jointly by a subsidiary of the Anglo-Iranian Oil Company and the Gulf Oil Corporation of America; nor those of the Qatar peninsula, from which an affiliate of the Iraq Petroleum Company will shortly be exporting considerable quantities of oil. All these fields are thus being developed by companies backed by large financial resources.

Middle Eastern countries have benefited in many ways from the exploitation of their oil resources by Western interests. (Right) *A watering-place used by camel caravans* en route *to Riyadh, capital of Saudi Arabia. This particular well, like many others in the desert, has been drilled by an oil company, which maintains it for the use of the bedouin*

Faced with malnutrition and various epidemics among the nationals they wish to employ, oil companies have constructed modern hospitals in which the latest treatment is available. (Right) *An Armenian nurse at the hospital near Kirkuk in Iraq. Most of the nurses come from Christian minorities as religious prejudices make it difficult to recruit Moslems*

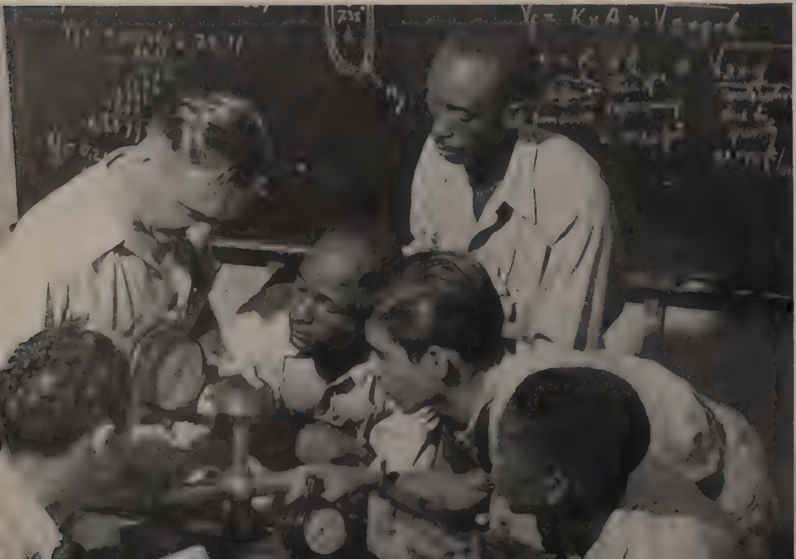


Nancy Jenkins

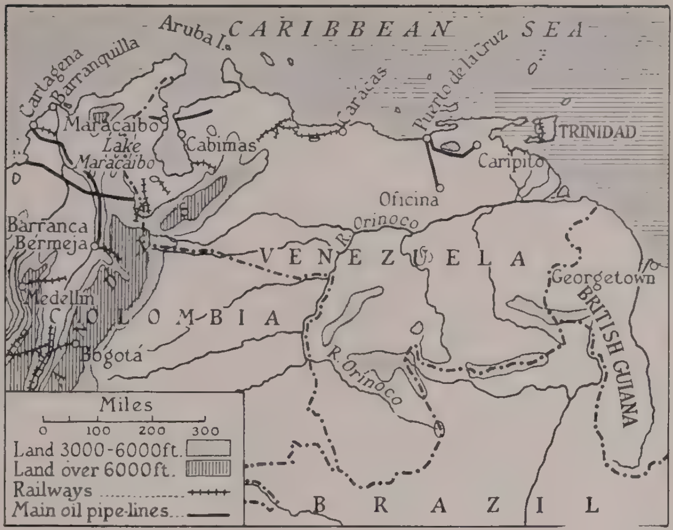
Students perusing the latest English magazines in the reading room of the Abadan Technical Institute which was completed in 1939 at a cost of £100,000 as part of one oil company's contribution to education. Here technical and commercial training is given to students from all over Iran, most of whom live in the hostels attached to the Institute

South American Indians also owe much to the benevolent interest of the oil companies in their health and welfare. (Left) *A mother and child in the maternity ward of an up-to-date oilfield hospital in Peru. Free treatment is usually available to all — not only to oil industry employees*

One of the staff of a Colombian refinery acts as football coach to the keenly interested juvenile team. As an aid to physical fitness sports of all kinds are encouraged and gymnasiums, tennis courts, athletic tracks and swimming-pools have been constructed in many of the oilfield towns



A class receiving training in instrument repair work on Aruba Island, one of the Dutch West Indies refining centres. Here schools established by the oil industry give technical instruction to apprentices and older employees with special aptitude, in addition to providing general education



A. J. Thornton

In Venezuela, an oil company spent no less than £12,000,000 and waited ten years for its first return, while comparable sums have been expended in other countries where the hopes of prospectors have been less richly rewarded.

Neither individuals nor the local governments, then, had sufficient financial resources to make such ventures successfully on their own initiative. The local governments, moreover, were lacking in the technical skill and experience for such enterprises. If large companies make large profits, it should not be forgotten that a very great proportion of profits is spent on providing new facilities and seeking new sources of supply. They also take great risks, risks outside the competence of individuals or of local governments.

ATTENDANT BENEFITS

It is an indisputable fact that the material standards of the peoples among whom oil companies work have improved out of all recognition; nor does the obvious jibe that such reforms were inaugurated primarily in the companies' own interests constitute any detraction from this truth. Manifestly the oil companies, particularly in such comparatively undeveloped lands as the Middle East and Venezuela, were bound to study the health of their local employees as well as that of the employees whom they had brought thither from more 'advanced' countries; they were equally bound to study the problems of education and communications. What have they done in these directions?

First, they have made conditions for their own workers a model for the rest of the country. They have never preached, they have practised.

Let two examples suffice for this. Cabimas typifies the camps which have arisen on and around the Venezuelan oilfields. It is now a small town with a school, a church, and a sports field, as well as shops and houses supplied with gas, water, and electricity. It is not part of some vast national planning, but just a housing estate built by an industry for its workers.

An even more striking example comes from Abadan, at the head of the Persian Gulf. Here is one of the most modern, as well as one of the largest, cities of Iran. It has a population of nearly 150,000, of whom over 40,000 are employed in the local refinery, which itself is the greatest in the world. Although part of Abadan lies outside the areas which the Company itself has developed, the A.I.O.C. has built, on the former island of palm-fringed desert, thousands of houses, for which every kind of material had to be imported. Lawns have been laid out, a park has been constructed, and trees and shrubs have been brought in from India and Ceylon. In Abadan, as in many smaller towns created in Iran, Iraq, Saudi Arabia and Bahrain, there are social clubs, cinemas and sports grounds.

Secondly, it is not only the material comforts provided by the oil companies that have appealed to the local populations, which now value very highly the work done in the sphere of health and education. For example, malaria has been reduced in the areas of the Iranian oilfields from being an almost chronic disease to an occasional illness. Cholera, plague and smallpox, once widely prevalent in southern Iran, have been entirely eliminated. Research work done in the hospitals of the oil companies into various tropical diseases has been magnificent. The schools, day and night, provided by the companies, have proved extremely popular, and literacy among employees is now such that the companies are always able to exceed the minimum requirements stipulated by some governments for the employment of their own nationals.

Thirdly, improvements in communications wrought by the companies, whether in roads, in railway or air lines, or in telephone or telegraph systems, are a necessary concomitant of successful exploitation, but to all dwellers in the deserts, mountains or jungles, through which such communications pass, they patently bring benefits.

SOME DANGER SIGNALS

Now it would be naïve to pretend that the successful development of oil in more or less primitive lands has had no disconcerting effects. Good pay, good conditions, the lure of the Western way of life, all such things inevitably disturb those who cling to the older ways. It might be argued also that if the oil industry prospers in the Middle East and Venezuela, other economic activities stand a chance of suffering, if only because of the tendency to desert them for more rewarding labour in the oil industry, and because of the higher standards which that industry introduces. Just as the discovery of rayon caused discomfort for manufacturers of natural silk, so the advent, more or less suddenly, of a highly skilled industry to lands which for centuries had carried on trade according to immemorial methods, was bound to have an upsetting effect. Many countries have gone through such phases, and not least England, with the Industrial Revolution which attracted men from the countryside to the towns.

Agriculture is the backbone of Middle Eastern economy; and though oil already occupies a large place, destined to increase, in the economy of several Middle Eastern lands, it is essential that its growth should be balanced by other types of development. These lands may be modernized: they need not be Westernized. The danger of such a sudden economic disturbance could be seen on a small scale in Bahrain before the war, when the island, with its Westerners, Indians, Persians and Arabs, seemed to have become more Texan than Arab in atmosphere. There must always be alternative industries, adequately supplied with labour. Fortunately, the governments of the Middle East and of Venezuela are well aware of the fact, and on the basis of royalties accruing from oil are already planning enterprises which will absorb thousands of workers.

OIL PAYS FOR REFORMS

It is the manifest intention, indeed, of the governments of Venezuela and of the oil-producing Middle Eastern states to secure a balanced development of all their physical and human resources. They have embarked upon or are planning vast schemes of social and economic reforms. For example, the Government of Iran, assured of very considerable oil royalties, has awaiting realization a Seven-Year Plan, providing, among other things, for extensive irrigation systems and the cultivation of new land, as well as improvements in roads, railways, telephone and telegraph communications, and in ports and harbours; nor has an increased output of textiles and of sugar, and the production of iron and steel been overlooked. The Government of Iraq, too, has an ambitious and promising project for the Wadi Tharthar dam designed to contain an artificial lake (nearly twice the area of Lake Meade at Boulder Dam), the water of which will be used to dilute the salt content of neighbouring land. Saudi Arabia already, through its oil royalties, has adapted for agricultural purposes a large area in Al Kharj, including eleven miles of canals, and has sunk wells in the desert for the bedouin's flocks—all with the active help of Aramco. In Venezuela, the thousands of square miles around the oilfields have been opened to development, and the Government has contracted with the oil companies to build roads from the towns into the interior, thus encouraging growers of coffee, cocoa, and so on, by providing access to new areas and markets.

Modernization of the Middle East and of Venezuela is inevitable. Even without the discovery of oil therein it would have occurred, for the Middle Eastern nations some time ago decided, like Venezuela, that in view of their relative weakness, they would have to adopt certain aspects of Western scientific civilization. Modernization is, indeed, rather the result of an attitude of mind than of anything else.

Yet it is unquestionable that the discovery and exploitation of oil have accelerated this impulse towards modernization. So many things—motor-cars, aeroplanes, power-driven irrigation pumps—which as yet are no part of everyday life in the Middle East, depend upon oil. A great proportion of the foreign currency accruing alike to the Middle Eastern countries and to Venezuela (or Trinidad) is derived from oil. The possession by these territories of a large and stable income enables them confidently to advance schemes for the welfare of the inhabitants. Thus in the Middle East, despite the continued prevalence of illiteracy, education has made remarkable strides: so, too, has the mechanization of agriculture.

In Venezuela the oil companies, at the request of the Government, are helping to

Abadan, with the oil refinery in the background. Its transformation in forty years from desert to modern town exemplifies the amazing developments which often result from the discovery of oil

finance an organization to improve farming, fishing, and other economic activities yielding local social benefits.

PROGRESS BY COOPERATION

Oil in the Middle East and in Venezuela can, obviously, become an undiluted blessing only if there are cooperation and understanding between the local governments and peoples and the oil companies. Too easily the cry of "foreign exploitation" can be raised, and the oil companies by their sympathetic attitude to the legitimate aspirations of the local inhabitants can, perhaps more than anyone else, help to forestall the over-ardent nationalist. Happily, there are manifest signs alike by the British in Iran, by the Americans in Saudi Arabia, by the international company in Iraq and elsewhere, that those in charge of the oil companies are fully conscious of the social responsibilities to which their operations give rise; they realize, too, that the manners and conduct of their employees should never offend local susceptibilities—this last point is in Muslim lands particularly important.

It can justifiably be claimed that the record of the oil companies towards the broader aspects of their activities is creditable, and is ever improving. There are many men in the Middle East and in the Caribbean countries who have seen at first hand the work of the companies, and their voices would certainly be heard if and when, in times of political excitement, the cry of the "greedy foreigner" were to be heard. But vigilance is constantly necessary. The onus is on the oil companies, not only to attain and maintain model amenities for their employees, but also to realize that, besides being seekers of oil, they are, by their very dimensions, ambassadors of great, if informal, influence for good or ill. Of the implications of this wider role it may be said that they are today far more conscious than they were but a decade or two ago.

Tombo and His People

I. A Masai Boyhood

by ELSPETH HUXLEY

Brought up in Kenya, Mrs Huxley has unusual qualifications for editing, in this and a subsequent article, the autobiography of a young Masai who, after graduating from Makerere College, is now teaching in his own country. Her two best-known books about East Africa are Red Strangers, *a novel of tribal life, and* The Sorcerer's Apprentice, *a record of recent travel (Chatto & Windus)*

Tombo ole Mbaei is a young Masai from Narok, in Kenya. Had he lived a generation ago he would have been a *moran*, a warrior, from boyhood shaped and tempered for battle. His dress would have been a short cape of ox-hide, his hair, done in ringlets or a sort of peruque, matted with sheep's fat and red ochre, his weapons a tall, slender spear, a sword, a club and a long hide shield painted with his clan's insignia. Tombo's days would have been spent on the wide, brown plains of his people herding cattle, save when the medicine-men who, in the main, ruled the tribe decided that the omens were good. Then Tombo would have smeared himself with the magic potions, donned his tall head-dress of ostrich feathers or lion's mane and his anklets of colobus monkey fur, greased his body and set off with his age-grade companions on the most exciting of all adventures, the adventure that made the blood of every Masai tingle and throb—an attack on another clan or another tribe, with its glorious prospect of blooding his spear and driving back the spoils, the victims' cattle, in triumph to his home.

Today, Tombo is not a warrior but an ex-student of Makerere College in Uganda, and a new-fledged school-teacher. Instead of raiding he passed examinations, instead of spearing lions he played football, instead of the war-dance he joined a debating club. Africa is full of contrasts, but none can be sharper than this, between the Masai moran with his spear and the Masai student with his pen.

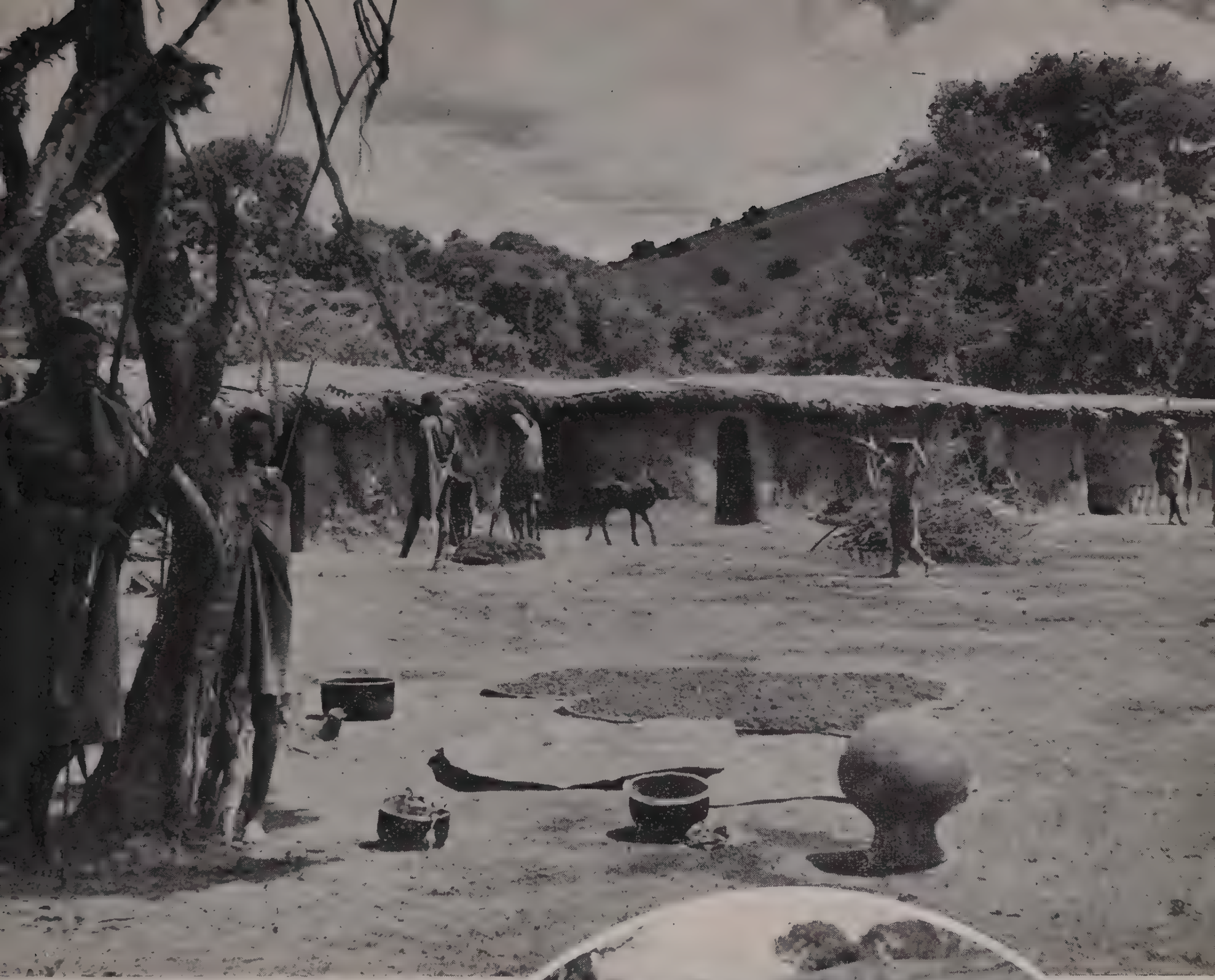
For, of all the tribes in Eastern Africa, the Masai were the most fierce and proud, the nearest to the 'noble savage' of European romantics; and they displayed the strongest resistance to 'civilizing' influences such as Missions and schools. While other tribes clamoured for education the Masai, with conscious pride in their blood and state, rejected it as a foreign and corrupting influence and continued to herd their little humped cattle on the huge, dry, thorn-speckled plains of southern Kenya and northern Tanganyika.

They do not live in ignorance of the new world—the trousered clerks, Nairobi's car-parks, maternity wards, dance-bands and demagogues—so much as reject it. They are nomads, and inhabit tunnel-like mud huts, pitch-dark and smoky, which can be built in a day and abandoned in an hour. They trek from pasture to pasture, the women following, their limbs encased in rings of copper wire, their household goods piled high on donkeys and human backs; and where grass and water offer promise they build a new *manyatta* for their beasts and themselves.

The beasts come first, always. The manyatta is grouped round a yard deep in dung. Flies are as much a part of the Masai's environment as sun and air. Flies cluster so thickly over the faces of babies and small children that the eyes are sometimes invisible. Opthalmia is widespread. For food, the Masai live on the blood and milk of their cattle, often mixed in gourds rinsed with cow's urine, curdled into the consistency of cheese; and, when a beast is slaughtered, on its flesh.

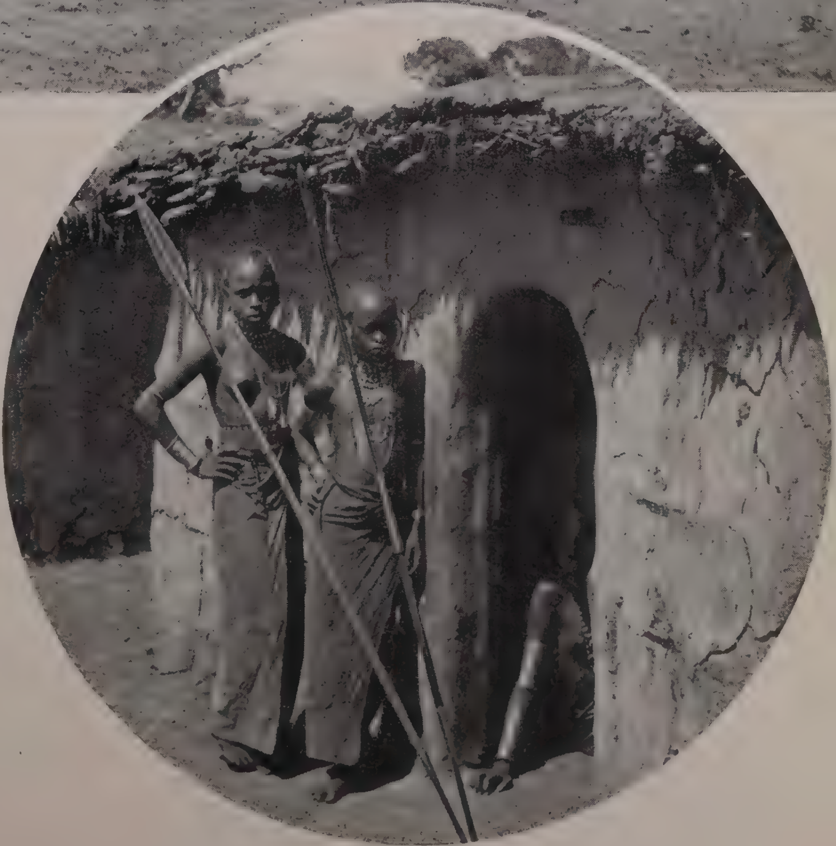
How, then, can we account for Tombo, the Makerere student-teacher, whose ambition is to continue his studies at Oxford? It is best to let Tombo account for himself. This he does in the extracts which follow, taken from an autobiography too long to print in full. For this reason I have summarized parts of it and quoted other passages.

"I have come to the conclusion", Tombo begins, "that I was born sometime between 1922 and 1923." His father, Mbaei, was about eighteen when, in 1899, the railway reached the site of Nairobi, then a little swamp on a plain almost literally 'crawling with game', as the astonished newcomers had it. This, and the years just before, was



Watkins, from Paul Popper

Wherever they find good pasturage the nomadic Masai build their mud huts, the thatched roofs of which are covered with ox-hide. Between circumcision and marriage the moran *lives with his fellow-warriors in the sort of barrack seen above; formerly these young men were ever ready to spring into battle with swords and long spears at a moment's notice.* (Right) *Unmarried girls beside a hut entry. Of the two Masai spears in front of them the one with a long blade is a warrior's and the other an elder's*



ra Watkins, from Paul Popper

a time, Tombo writes, "of devastating feuds and civil wars among the Masai. It also happened at the same time that terrible human and bovine epidemics swept all over the country. It was due to all these fateful agencies that the way was made easy for Europeans to enter Masailand. The Masai people were conscious of their weakness and they saw the futility of putting up resistance against such odds. But worst of all, they were disunited."

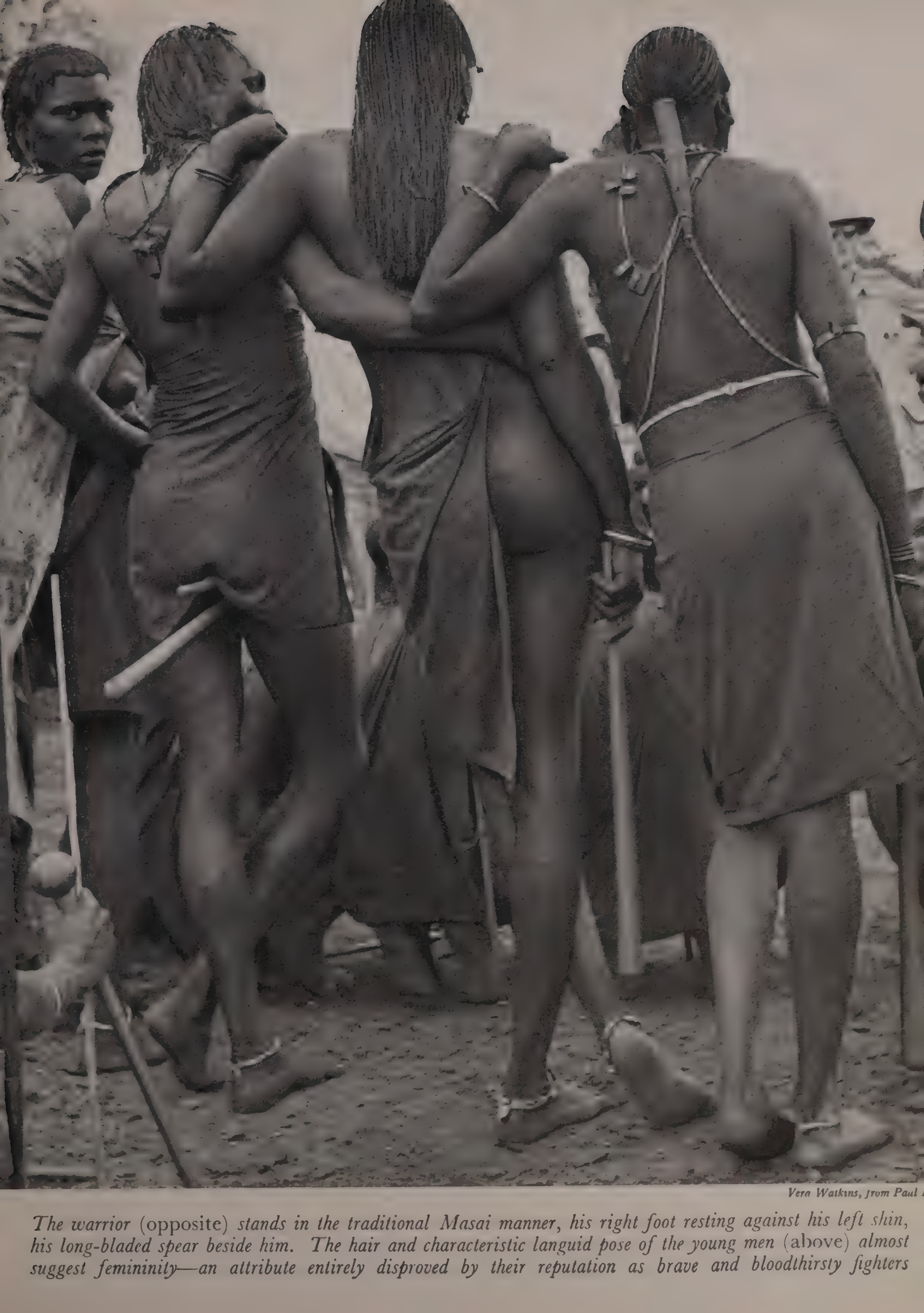
The Masai are divided into clans, which were often at war with each other. Inter-clan raiding and slaughter, followed by a severe smallpox epidemic, broke up and scattered the clan to which Tombo's grandfather belonged. Then came a sad experience. Ravaged by smallpox, defeated and starving, surviving Masai exchanged many of their women and children for food brought down from the fertile highlands by the Kikuyu they despised. These women, among them Tombo's grandmother, became virtually the Kikuyu's slaves.

Mbaei was taken by a family who treated him well. For a while he worked as a labourer in Nairobi; this enabled him to save money, buy sheep, and eventually pay the bride-price on a young Kikuyu girl called Wangare.

At the end of the first World War, Mbaei married a second Kikuyu girl—Tombo's mother. Soon afterwards he was converted to Christianity, and his newly married wife followed his example. They decided not only to learn the Catechism and prepare for baptism, but to start schooling at the Africa Inland Mission at Kijabe, in Kikuyuland. Wangare stubbornly refused either to accept Christianity or to go to school.

"Father and Mother then started going to school together. They were in the same class throughout their short school career. When they reached the stage of attending afternoon classes, in which the first few words of English were taught, Father fell seriously ill. It was after his illness that he began seriously to think of his relatives in Masai, whom he instinctively believed were still alive. He made several trips in company with others to Masai, trading in sheep, and it did not take him long to discover his relatives, among whom was his stepmother." So Mbaei left his adopted land of Kikuyu and returned, with his flock of sheep and his two wives, to his own country. He soon found himself deep in a doctrinal tangle which to this day confuses relations between Africans and the Christian Missions.

"The Africa Inland Mission at Kijabe



Vera Watkins, from Paul

The warrior (opposite) *stands in the traditional Masai manner, his right foot resting against his left shin, his long-bladed spear beside him. The hair and characteristic languid pose of the young men* (above) *almost suggest femininity—an attribute entirely disproved by their reputation as brave and bloodthirsty fighters* refused to baptise Father on the grounds that he was a polygamist. They went as far as suggesting to him that he should 'throw away' one of his wives. This was impossible, and heart-breaking for him. His first wife had three children by this time; Mother had only me, but he loved them both, and even more ourselves, his own children. He found it too cruel to think of throwing any of us away. He tried again to follow faithfully and hopefully the Catechism classes. Again he was rejected on the same grounds. He then resolved to cling to his faith in God and in Jesus Christ whether he was baptised or not. This faith he keeps to this day, although he actually married another wife later. Father has always been interested in the education of his children—boys and girls alike. He used to conduct reading and prayer classes at our home in Syabei which became very popular. Those of my step-brothers and sisters who were old enough were sent to the sporadic A.I.M. elementary school at Syabei. This little school used to be run intermittently for about a month or three months at a time. . . .

"Masai people should be profoundly grateful for the daring spirit of those pioneer missionaries who are the only body—except for some work done by the Presbyterian church at Ngong—they are the only missionary body that has dared to come and evangelize the Masai. If there is any Christian light in Masai, thanks are due almost entirely to the A.I.M. under the good guidance of God."

Tombo's childhood—like, I think, that of most African boys—was happy. From an early age, lads were encouraged to 'run together' in groups and fend for themselves, so as to learn self-reliance and toughness. When he was about ten or eleven, Tombo writes, he began to accompany his father in the herding of the sheep and cattle.

"I had some rude shocks in those early days. Once, as I was following the goats, a leopard, apparently from nowhere, sprang on one of the goats about ten yards in front of me. Before I could collect myself it had killed the goat, and was greedily sucking blood from the neck, while the other goats at once stampeded in all directions. Instinctively I threw the little spear I had in the direction of the wild beast, but it never touched it. However, this had the desired effect, for the leopard was frightened and ran away. I do not think that it even saw me as I stood half-heartedly behind a bush calling for Father, who fortunately was very near. On his arrival, I became very brave—recounting even 'how I had chased away the leopard'."

* * * *

"Up till 1932 I knew nothing about nomadic life. Even herding had been on occasions, never for more than a few weeks at a time. After this it became my whole occupation. I used to be in a shirt and shorts, now I had nothing on but a little sheet about two feet square and a hard, badly treated goatskin cloak. Of course, like other boys, I had my little sword and spear. I was very proud of my weapons. They gave me tremendous confidence.

"When my elder brother and I took to nomadic life, we learnt a great deal about cattle. We learnt to milk for ourselves, to care for the calves, to build the very important fence round the *boma* for protecting the animals, and even to build huts. It was an excellent time of 'unorganized' scouting activity. We did learn to be independent. There is an incident that took place in 1934 at Suswa, in the Kedong valley, that I will never forget.

"My elder brother had been left at home as he was unwell. I made up my mind to move the cattle alone—attaching myself to another herd which was looked after by a young man of about twenty-five and a little boy of about my age. (I was then round about ten or eleven.) We camped near a watering place on the western flank os Oldonyo Onyokie, called Enkejo Arro. Thif place had excellent pastures and plenty of water, but it was teeming with lions. In fact we camped only a few hundred yards from their route to the mountain. However we did not discover our fault until too late.

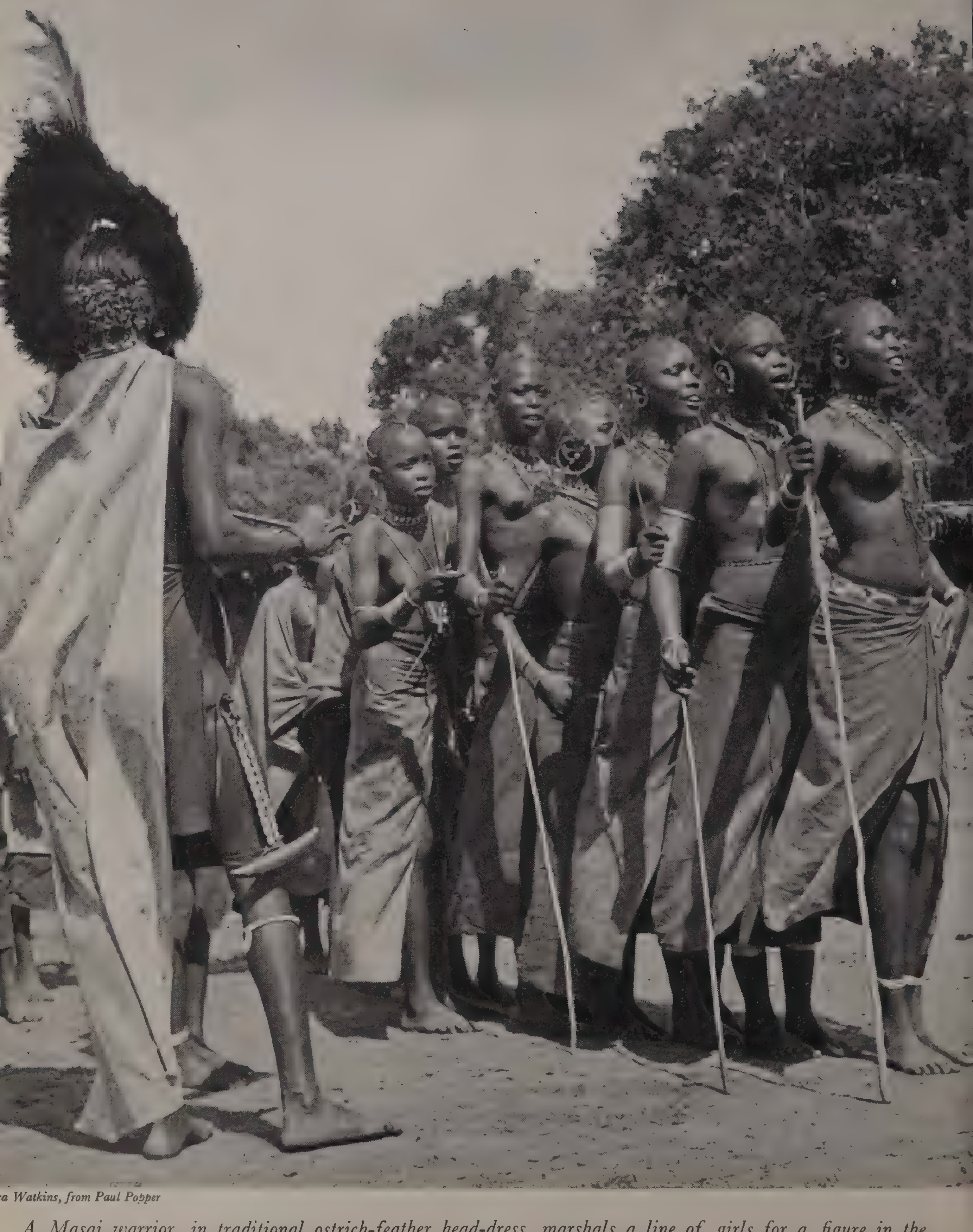
"The first night was a comparatively peaceful one. Lions came roaring down from the mountain to the watering place but did not molest us; they did not even seem to be aware of our existence. Unfortunately for us —the two little boys—the young man we accompanied was deeply in love with a certain girl at Nairagiengare. He was determined to go and see her on the second day. So we were told to look after the cattle as he had some business to attend to at home, but that he would be back in the afternoon. He came back late in the evening of the next day.

"Left by ourselves, we did not bother to collect much firewood for the night, as we expected the young man to perform this all-important duty. However, knowing the dangerous nature of the place, we drove the cattle home quite early, at half-past five,

Crown copyri

So large are Masai herds that the tribe is one of the richest in Africa. But owners' reluctance to part with their beasts results in over-stocking and consequent soil-erosion. (Above) *The Government organizes cattle-sales to encourage disposal of the surplus.* (Below) *Droughts are frequent and many 'rivers' are mere sandy drifts, dry during most of the year. Masai cattle being driven to water at holes scooped out of the sand*

Crown copyrig



a Watkins, from Paul Popper

A Masai warrior, in traditional ostrich-feather head-dress, marshals a line of girls for a figure in the snake-dance. Dancing is a favourite sport of both sexes. Formerly, when warriors danced before battle they worked themselves up to a state of frenzy that made them shake uncontrollably; this practice is now forbidden

International News Photos

Warriors with the traditional coiffure, but without their spears. Since authority stopped cattle-raids, much savour has gone out of the young men's lives. Most of them are too proud to work for settlers or the government; but resistance to schooling is slowly breaking down among youngsters

and started milking. After milking we managed to collect a little firewood. By half-past six there was a chorus of roaring lions from the mountain and a more ominous one from the watering place about half a mile away. I called my friend and we conferred on the most strategic positions to occupy for guarding the cattle. We decided to light two fires on opposite sides of the boma, each of us occupying his own and moving constantly after every few minutes round his semicircle.

"The condition we were in was really bad. The fence round the boma was no more than two and a half feet high. It just kept the cattle in. We could see outside while sitting down by our fires. After supper we began our rounds. We shouted occasionally when we thought the lions were getting dangerously near us—which I do not suppose they ever tried to do. There was no village near us, so we did not hope for any help in case of attack. Incredible as it may seem, we were quite courageous—I suppose from sheer ignorance of the danger. We even talked of throwing fire at the lions if they 'dared to come'. The excitement kept us awake all night, we never slept for an instant. We heartily thanked God when the morning came. The cattle behaved extremely well. When the chorus of roaring lions became too loud the cattle stood up and lifted their heads to smell the direction from which the lions might come. As soon as they discovered this, they all looked to that side. We took this as a signal and posted ourselves—one in front and the other behind the cattle. . . .

"The young lover turned out to be a thoroughly bad fellow. His first action on arrival was a demand for some milk. We had not milked in the morning as the calves spent the night beside their mothers. We had nothing to offer him, therefore, when he came. We paid heavily for it. He beat us thoroughly. He even dislocated one of my thumbs. I hated him for it and made up my mind to leave him as soon as I could. I told my father of the young man's outrageous behaviour and he helped me to drive away our cattle to another boma. We had about a hundred head of cattle in those days, excluding calves under a year old . . ."

* * * *

"In those days, between 1933 and 1934, I learnt to train and guide cattle wherever I wanted them to go. I could make them follow me at full gallop to the watering place, as we had to try to get our cattle first on the spot before another herd made the water muddy. My brother and I used to take great pride in being first almost always at the watering pools. When herding on pleasant and peaceful occasions, we sang and recited praises to our cattle in preparation for the daily evening competitions in reciting short poems in praise of the cattle. Unfortunately I forgot all these lovely poems when I went to school, especially as I tried to avoid anything traditional, as it was considered by the missionaries as wicked or unChristian. I never fully learnt the Masai songs and dances, much as I often longed to, simply because of my views on Christianity as I had been brought to understand it. . . .

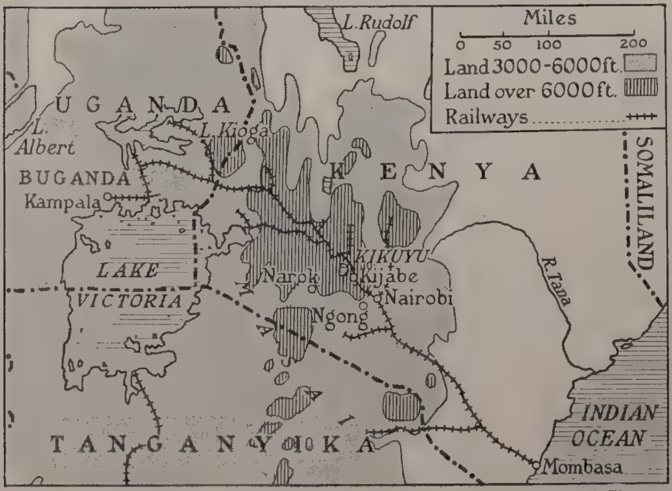
"All the time I was herding cattle, Mother was working hard to persuade Father to send me to school. Father was rather reluctant because of the favourable reports he heard from those whom I accompanied on my nomadic movements. All those people with whom I came into contact said that I 'loved cattle'. The phrase 'he loves cattle' is very significant in Masai. It is an honour to have it said. I was always proud of this, for all those people still remember me with the same old background. They still trust me and like me because of it. Some of them were very furious when they heard of my father's decision to send me to school. They prophesied that Father's herd would die off because it 'had no longer a good loving shepherd'. This was a reflection on my elder brother, to whom an opposite phrase was applied. They said 'he hates cattle'. This was very disagreeable to him because he knew it was true. Soon after I was sent to school he ran away to his uncle in Kikuyu and did not come back until he was of an age for circumcision."

In 1935 young Tombo, then about twelve or thirteen years old, entered the government school at Narok, one of the few which catered, under many difficulties, for a tribe exceedingly reluctant to make use of such amenities. Tombo's schooldays will form the theme of a second article.

Like all schoolboys, he looked forward eagerly to the holidays. Among many tribes, boys who have won the prestige of literacy despise the pursuits of their unschooled fellows; but the love of cattle is too deeply embedded in the soul of the Masai to be withered by book-learning. In the holidays, Tombo became a cattle-herd again.

"I enjoyed the lordly whistling ahead of the cattle, especially during times of plenty when I would 'drill' the cattle to form a crescent to their front, grazing peacefully behind me. The puffing of their noses as they advanced, swinging their heads rhythmically as they devoured the grass, all this formed a sight that thrilled my heart. At such times I would defy anybody or anything. I felt invincible. . . .

"On December 14, 1937, my elder brother and my sister (who died) and I underwent the usual Masai initiation, i.e. circumcision ceremony. I was rather young for this . . . After this ceremony I entered a new kind of life. I entered the company of young men who did not undergo the normal warriors' course, either because they came from Christian homes, or because their parents were cultivators who had married Kikuyu wives and so could not enter fully into the traditional nomadic Masai life . . . The company of these young men was quite attractive to me then. They did very little work but delighted in making nightly rounds through the villages visiting their friends or, more often, in quest of girls.



A. J. Thornton

"The briefness of my vacation prevented me from indulging too much in these rambles and escapades. Furthermore I was always re-

Masai warriors play bao, *a complicated game requiring a good deal of mental arithmetic; it is known by different names all over Africa. Each player starts with an equal number of beans; these are dropped into small holes according to certain rules, the object being to capture one's opponents' counters, as in real life the warrior's object was formerly to capture his opponents' cattle*

Elspeth Huxley, from Paul Popper

quired by my parents to do a certain amount of work at home. They never worried about how I conducted myself generally, but they encouraged me to attend Church regularly; what was of greater consequence, they encouraged me to participate in the services. Sometimes I sang a hymn in Church, sometimes I conducted the singing. Later on I found myself preaching. None of these things ever embarrassed me for the simple reason that I took them quite naturally and enjoyed doing them. . . .

"After the initiation ceremony I stopped herding, except on particular occasions. Now I turned to digging or erecting strong fences round our field or small farm. By 1940 I was so active at home that I had little time for the pleasure rounds with the young men. My attitude had changed. I had come to realize that their company was misleading . . ."

Tombo now relates a short-lived love affair. Among the Masai, wide licence is permitted to young men and women after circumcision. Marriage comes later, a deeply serious affair. Tombo became attached to a girl, and she to him; marriage was suggested; he found himself forced to choose between marriage and his career.

"Although I loved her, admired her and respected her, I was not prepared to stop my studies for marriage. I was too keen to go on . . . Our love was simple and pure. There was nothing for us to be ashamed of. She was illiterate, and this was very fortunate for me as I was never plagued with letters once I had left home for school. It was only during the vacations that we met. In 1942, things took a different turn. Someone else proposed to the girl . . . It was a very difficult situation when I had to bid her goodbye. It was painful. I could hardly bear the stinging fact that I had disappointed her. I made up my mind never to disappoint anyone again. But then I had just passed my Junior Secondary examination with considerable credit which meant that I could go on to Senior Secondary. So everything had to go by the board—including the girl."

In spite of such distractions, Tombo found time during the holidays to train some of his father's oxen for draught purposes. This was an innovation, for among the Masai cattle are never used to pull carts or ploughs. Doubtless many of the elders looked on this foreign practice as a form of sacrilege, and Tombo's step-brothers did their best to sabotage his efforts. But he persevered, built a rough cart and used it to haul produce to the market. "My Mother", writes Tombo, "put her whole weight on my side", and no wonder; in the absence of draught animals, women are the beasts of burden and, among tribes that cultivate, diggers of the land.

In his last year at school, Tombo passed the entrance examination into Makerere, the college in Uganda which provides higher education for the scholastic *élite* of six East African territories. In 1945 he entered the college and embarked, at the charge of the Kenya Government, on a course lasting four years to qualify as a teacher. His intention was to return to one of the schools in Masailand and take his share in the education and enlightenment of his still primitive people.

Why Greenland?

by TREVOR LLOYD

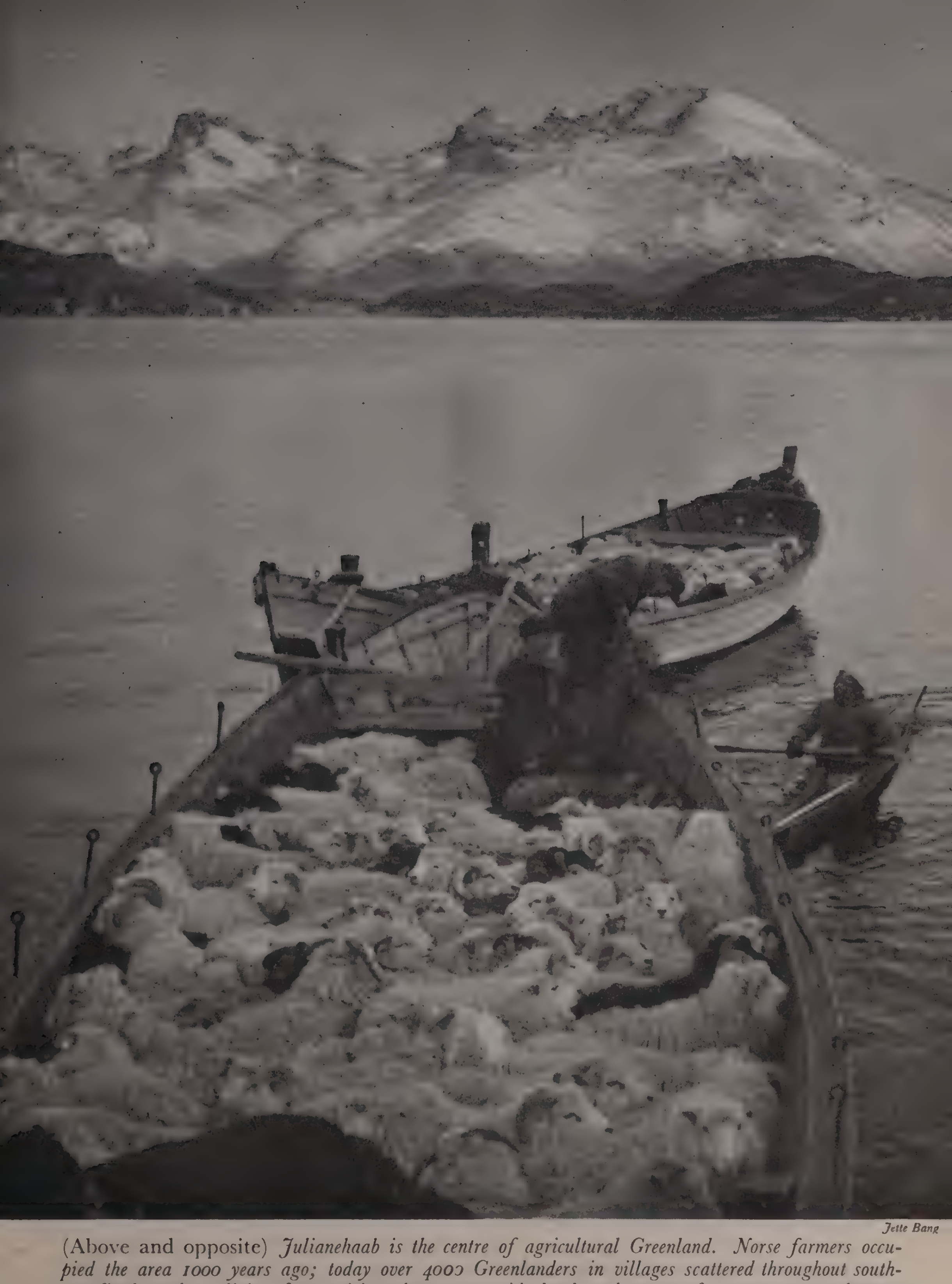
e Bang

Dr Lloyd, who settled in Canada in 1931, has taught geography in Canadian and United States schools and universities and is at present Chairman of the Department of Geography at Dartmouth College, New Hampshire. In addition, he edits Arctic, *the journal of the Arctic Institute of North America*

THOSE of us whose knowledge of the geography of Greenland is based on the renowned missionary hymn often find it difficult to understand how the island received its name. "Icy mountains" sound reasonable enough in such latitudes, but *Green*land seems a grave misnomer. Some school history books assert that Erik the Red, the Norse colonizer, anticipated difficulty in persuading his fellow-countrymen to settle in the new land unless it was adorned by an attractive name. To one familiar with West Greenland, such an explanation is unnecessarily elaborate. The name was, no doubt, given because the new land appeared to the first settlers as a green land, one greener than that which they had come from. David Crantz, a remarkably observant and well-informed Moravian missionary, writing in 1765 put the matter this way: "The name Greenland was given . . . several hundred years ago by the Norwaymen and Icelanders, who first discovered it; and the reason for the appellation or epithet *Green*-land was, because it looks greener than Iceland"; and with that most reasonable explanation, we can leave the title and look at the subject.

AIR JOURNEY TO GREENLAND

My own arrival in Greenland provided striking confirmation of the relative attract-

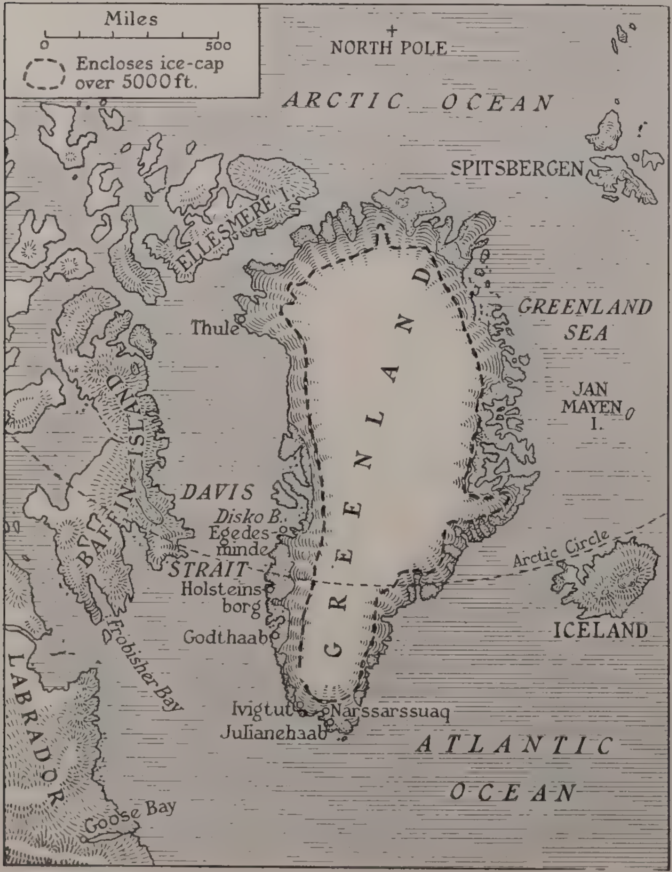


Jette Bang

(Above and opposite) *Julianehaab is the centre of agricultural Greenland. Norse farmers occupied the area 1000 years ago; today over 4000 Greenlanders in villages scattered throughout southern fjords make a living from raising sheep to provide lamb and mutton for west-coast settlements* iveness of the west coast of the country, even in winter. With my wife and seven-year-old daughter I had been ordered to report as Canadian Consul at Godthaab, late in October 1944. The Royal Canadian Air Force provided transportation in a Canso amphibian, graced by the name *Nugluk*, which is Canadian Eskimo for Snow-goose. The aircraft and its crew had spent the previous summer transporting surveyors throughout northern Canada and so were accustomed to high-latitude flying. The season was late, and the weather stormy, but the crew appeared confident that they could bring us down safely on the sea in Godthaab harbour.

Northward from Goose Bay, Labrador, the flight took us over progressively bleaker-looking country until the first landing at Frobisher Bay, Baffin Island, on a wind-swept and rock-bound aerodrome. A small Eskimo settlement nearby confirmed our worst fears about the state of the northern natives at that time. Yet, five hours after leaving this singularly inhospitable countryside, we had crossed Davis Strait to Godthaab, which from the air looked rather like a seaside village in Norway or Iceland. Those five hours spanned the ages, from a land of still primitive nomadic Eskimos to something that seemed to us to be the frontier of modern Europe.

We were transferred to shore in two dories, manned by native fishermen who had been hard at work when we arrived out of the sky. Both of the men were of course Greenlanders. I was a lone passenger in one dory, surrounded by baggage, while Mrs Lloyd and Mona rode in the other. My oarsman seemed highly amused at his companion's cargo. Then, speaking halting English, he said: "Man goes out in boat to catch codfish, and comes back with two ladies." I like to think of that first Greenland encounter as typifying the people's wry humour, and also their determination to learn everything possible from strangers. This man had, I later heard, picked up his few words of English from some American builders who, not long before, had spent a few weeks erecting a house at the settlement.



A. J. Thornton

WHICH GREENLAND?

Impressions of Greenland depend very much on the part of the country visited. There are at least half-a-dozen different, and equally typical, regions. Until the war years, many Americans thought that all of Greenland was like the far north-western corner about which they had learned from the writings of the explorer Peary. All Greenland residents were thought of as "Arctic Highlanders", and like those who aided him on his North Pole journeys. That this view is not yet entirely replaced is shown by an account of the country published in 1945 when the author stated that "the Eskimo is a nomadic hunter" and added: "Among his assets are his wives, who chew the skin and make the clothes." This statement is partly true of the Eskimos of the north-west and the east coast, except of course for the implied polygamy which is as rare in Greenland as it is in the United States. The relatively pure Eskimos of the Thule area of

Paul Hansen, from Grønlands Styrelse

Summer visitors to south-west Greenland soon learn why the island received its name; though mountain peaks may be snow-covered the valleys are green with lush grass, bushes and even small trees

north-west Greenland form about one per cent of the population of the country.

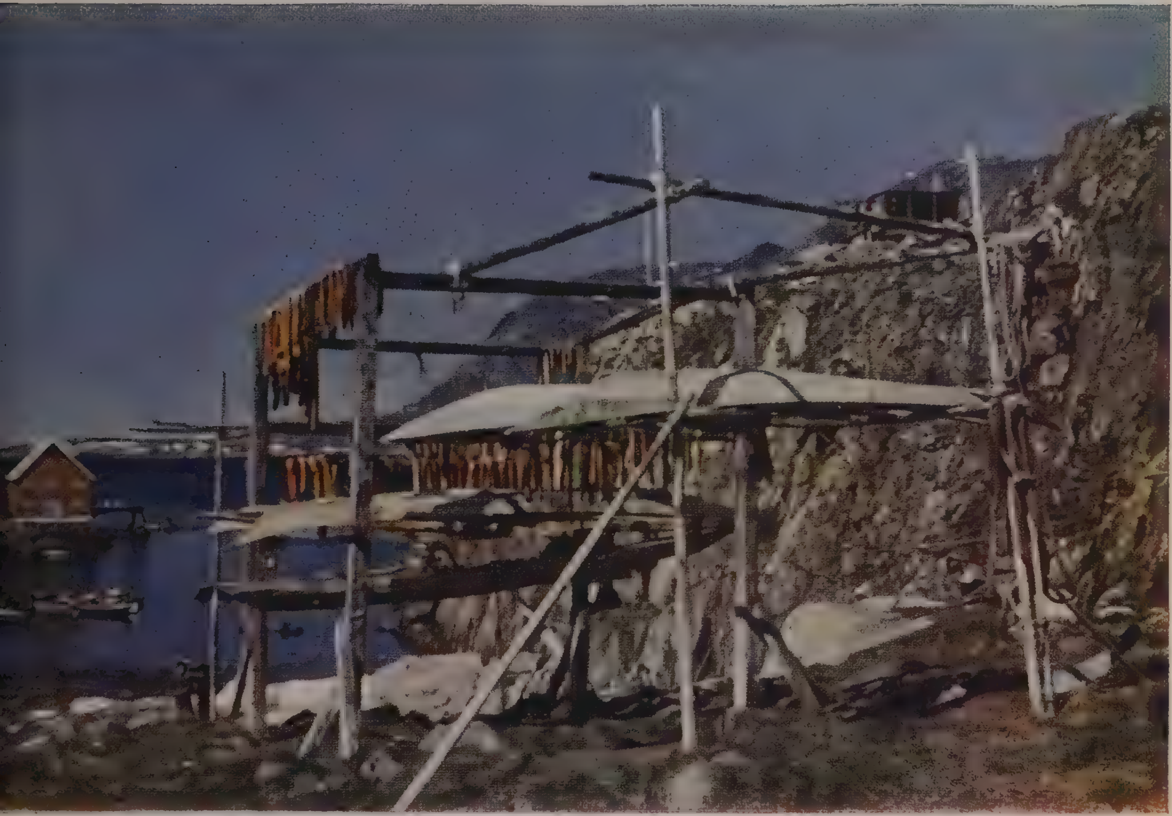
East Greenland, where less than ten per cent of the native people live, is still relatively free from European influence, although all of it is Danish territory and under effective administration. Access is difficult because of the heavy polar ice-floes offshore and the severe climate.

Summer visitors to south-western Greenland find it to be a green and smiling land with pleasant brooks flowing through valleys bright with flowers. The site of the large United States Air Base at Bluie West One (long known in Greenland as Narssarssuaq or "the large, flat place") was described by Crantz 180 years ago: "Many Greenlanders live in this place, and in all likelihood it is the best, most fruitful and agreeable place in all Greenland; we not only hear all the Greenlanders extol it . . . but a great quantity of ruins of old Norwegian dwellings are found there." It is toward such places that Greenlanders are now moving as they turn to sheep-farming and to a lesser degree to agriculture.

Very few Greenland residents have seen the eighty-five per cent of their country that is everything the hymn-writer imagined it to be. This is the ice-cap, a mass of solid, snow-covered ice thousands of feet thick, overflowing here and there along the coasts in glaciers from which icebergs break off to be carried away by tides and currents. Less than a dozen exploring parties have crossed the ice-cap on foot, although probably thousands of fliers have done so by air. During the late war several aircraft accidents marooned parties on the ice for some days, and as recently as Christmas 1948 a dozen American fliers spent three weeks on it waiting to be rescued from nearby air bases. Any one who has seen the ice-cap from the air can never forget that humanity is in a very real sense clinging to the fringes of the land in Greenland—caught between the ice and the sea. While more than 22,000 people make a living at one or other of the settlements scattered along the coasts, it would be foolish to deny that their living is a tenuous one, or that the environment is rigorous.

All Kodachromes, except one, by the author

A small village near Godthaab, inhabited by seal-hunters and cod fishermen. Most of them live in little woode houses, but a few old-style sod-and-stone homes remain. The kayak-hunter is off to the islands after bird



Holsteinsborg, the southern limit of winter dog-sled travel. The voracious appetites of huskies necessitate storing kayaks on high racks, where shark meat for dog food is also hung up to dry

WHO ARE THE GREENLANDERS?

What of the Greenland people? Who are they, and what do they do for a living? Apart from four or five hundred Danes who live in the country as administrators, teachers, missionaries, medical officers, technicians or sailors, the people of Greenland are related to the Canadian and Alaskan Eskimos. Students at the Godthaab Teachers' College may study "Comparative Eskimo", a course in which their own language is considered in relation to those of Arctic North America. Twenty-five years ago, Dr Knud Rasmussen led his Fifth Thule Expedition from Greenland to Alaska by way of Northern Canada, and found that he and his Greenlandic companions were very much at home throughout the journey. Until recently there still lived in Thule an old lady who as a child had crossed from Baffin Island, Canada, with the last group of migrating Eskimos. It may be assumed that the original natives of Greenland arrived from the same direction. One of the fine points which I, as a Consul, had to determine was whether any Greenlanders wishing visas to visit Canada were to be regarded as "Returning Canadians"!

It is doubtful whether the early Norse settlers left much evidence of their intermarriage with Greenlanders, although some of the mixed blood very evident today may be due to this. Most of it probably dates from the period in the 17th and 18th centuries when whalers and other sailors were regular callers along the coast. Since the first Danish settlement in 1721, intermarriage has been fairly common and of course continues to this day. There must be a considerable number of residents of Denmark who have some Greenlandic blood. As European contacts with Greenland increase, Greenlanders as a racial type will tend to disappear.

All Greenlanders are now literate in their own language, and an increasing number of them speak Danish. The war promoted interest in English, partly through the use of the radio but more through the importation of supplies and equipment from the United States and Canada, and the widespread distribution of magazines and newspapers. Elementary education is compulsory through-

Godthaab, Greenland capital, has recently grown rapidly. (Above) *"The suburbs" with Teachers' College at left*
(Below) *Church and Deanery; Governor's house left centre and statue of Hans Egede (colony's founder) far lef*

olsteinsborg shipyard provides good technical training for young Greenlanders. (Above) *The* Fylla *is prepared r a voyage to Thule.* (Below) *A village audience arrives for a Canadian film show aboard the Consul's boat*

A west Greenland village, unattractive in spring when winter's refuse is exposed by melting snow. The small pile of firewood was harvested from the sea, which had probably carried it from Siberia

out the country. Until now the language of instruction has been Greenlandic, but a rapid change is being made to bring Danish to the fore on the urgent requests of the Greenlanders themselves. Much of the present literacy can be attributed to the installation of a printing press at Godthaab nearly ninety years ago. From the beginning it was managed and operated by Greenlanders trained in Denmark. As I write, there is in front of me a copy of the Greenland magazine *Atuagagdliutit*, issue number 128, for September 1869. This paper was freely distributed in an endeavour to give the residents of Greenland some contact with the outside world. It has appeared without a break since January 1861. In addition to the text, the magazine contains many large lithographs drawn by a Greenland artist. Among them is an elaborate sketch of the Crystal Palace, and in the same issue an article and sketches dealing with the attempt to construct a trans-Atlantic cable across the Greenland ice-cap. Effective though this instruction of the Greenlanders in their own tongue may appear to be, it is of course quite inadequate for the present day and the people feel it as a barrier cutting them off from the rest of humanity.

Church missionaries deserve credit for the high state of Greenlandic culture, relative to that of Eskimos in Canada and Alaska. In this the Danish Lutheran Church and until 1900 the Moravian Brethren worked together. Today the Danish State Church carries on alone, providing Danish and Greenlandic ministers for all the larger settlements and native catechists for the outlying hamlets. The modern Greenlander is a faithful churchgoer, and the ladies welcome the opportunity to wear their attractive native costumes. Congregational singing is among the best I have heard since my youth among the chapels of the Rhondda valley.

THE GREENLAND ECONOMY

"The sea is their cornfield, and the seal-fishery their most copious harvest", wrote Crantz of the mid-18th century Greenlanders. While seals are today relatively less important, the sea still supports the Greenland economy.

The increase of sheep-raising in the Julianehaab district in the south-west, and near Godthaab, provides an important amount of fresh and preserved meat for the whole west coast, and wool which is used in modest home-industries. It is however the codfish, together with seals, whales, walrus and other products of the sea, that provide work for most Greenlanders. A slight increase in temperature of the west Greenland current, first noticed about thirty years ago, led to an influx of cod to places as far north as Disko Bay. Believing the change to be temporary the Administration for a long time hesitated to encourage the seal-hunters to give up their traditional skills and to obtain the necessary equipment for fishing the cod by modern methods. It is now realized that even should the cod retreat to the south, the Greenlandic fishermen, if adequately trained and provided with motor vessels, can follow them to the new grounds as have North Atlantic fishermen for centuries. Most Greenland cod is salted for export to the West Indies and Mediterranean countries. Important amounts of shark and cod-liver oil are processed, as well as the traditional seal and whale oil, walrus hide and so on. Eider-down is gathered near northern settlements, and shrimps are caught and canned for export at Holsteinsborg.

The Greenland economy could not be maintained at its present level without revenue from the export of cryolite, a mineral which is mined at Ivigtut in the south-western part of the country. Administrative policies have until now excluded native Greenlanders from this industry, in the hope of protecting them from undesirable outside influences. It is now recognized that much of the semi-skilled labour in the mine can be adequately handled by Greenlanders, many of whom have received excellent training as craftsmen in Denmark. Another mining enterprise is the extraction of coal in the Disko Bay area. Crantz wrote that "some coals were found at Disko, but they are said to burn badly and stink"; and simple honesty requires that this opinion be supported from our own experience with Greenland coal in the kitchen stove. However, about 10,000 tons are mined annually and distributed to coastal settlements for household use. Shortage of fuel is a serious problem in such a cold climate and unless, as seems possible, better-grade coal is found, a general change-over to imported oil may be necessary since the use of seal-oil lamps has all but ceased.

Much has been written of the manual dexterity of Eskimo craftsmen. Greenlanders make excellent carpenters, mechanics, boat-builders and radio operators. Since the late war steps have been taken to increase training in these skills within the country and to encourage more young men and women to go to Denmark for advanced training. At Holsteinsborg, where a successful ship-repair yard has been operating for nearly twenty years, there is now a well-established junior technical school. In 1945 I watched with some astonishment the repairs being made to hulls and engines of vessels which had to be kept moving because of the war-time shortage of shipping. The best of the apprentices were every bit as good as boys of the same age in the United Kingdom or North America.

WHO GOVERNS GREENLAND?

Greenland is a Danish colony and until the late war was administered directly from Copenhagen. This meant close supervision of every detail of the country's social and economic life. About a dozen larger settle-

The wives of Danish administrators do much to improve home life in Greenland and skill in needlework has been passed on to Greenlandic women. This tapestry view of Egedesminde, for example, depicts the local topography very well and even includes the barrels of oil awaiting export

Greenlanders and Danes are enthusiastic horticulturists who fill their homes with plants in winter and cultivate fine gardens in summer. The cold-frames give their plants an early start

ments served as local administrative centres, each with a number of smaller settlements as satellites. Two Magistrates, one for the North and one for the South, provided general supervision, but direct contact between each settlement and Copenhagen was encouraged. The war, which cut Greenland off from Denmark for five years, proved that the Colony was capable of looking after its own affairs in many ways. Because of this experience, there have been many changes in administrative policies and in the relationship of the home office to educational, religious, medical and trading affairs in the country. The policy of rigid isolation, which made it quite impossible for non-Greenlanders (including Danes) to trade or traffic with Greenland, is likely to be modified, and the 'Europeanization' of the Greenlanders is likely to go on apace. Denmark is now spending very large sums on radio and weather stations, on modern harbour facilities, on new hospitals, and on more and larger schools. In the past Danish policy in Greenland has received high praise from students of colonial government; it is encouraging to see these same policies being so radically modified to meet the changing conditions of the times.

Shortly before I left Greenland in 1945, I asked a senior official whether he thought Greenland would in time achieve complete self-government. He replied: "I hope so. My job here is to make my job unnecessary. In one more generation the whole country should be run by the Greenlanders themselves." Then he added: "Of course, by that time, they will all have become Danes."

The last Greenlander I saw was a lad serving as an apprentice on the motorship *Linda* which carried us from Godthaab to Montreal. He was at the wheel as the vessel nosed its way up the St Lawrence to Montreal. He spoke only Greenlandic-Eskimo and a little Danish. Having watched him at work in fair weather and very foul indeed, I am sure that in a surprisingly short time he will be a qualified ship's officer, a credit to his Greenlandic forebears and his Danish colleagues.

A Botanist on the Amazon

What we owe to Richard Spruce

by KENNETH G. GRUBB, C.M.G.

This year falls the centenary of a little-celebrated event; Richard Spruce's departure for the Amazon. Mr Grubb, who tells of its important consequences, has himself travelled extensively in South America and is now Secretary-General of Canning House, the Latin-American centre in London

"As every schoolboy knows" there were stirring times in Europe a century ago. There were liberal revolutions on the Continent, popular demonstrations in England, the Communist Manifesto and what else? No doubt, all sorts of things, and among the quite minor, almost unnoticed happenings of the time, was the exploration of the interior of South America by British pioneers. In 1848-9, Bates, Wallace and Spruce arrived in the Amazon basin.

The first two reached Brazil in 1848, and Spruce in the following year. They were a remarkable trio. Bates is the best known. He spent eleven years continuously in the region, living at Teffé, a little township of the Solimões or middle Amazon. His book *The Naturalist on the Amazons* is well known and much of his account of conditions could stand today. I have myself witnessed scenes in the remote settlements of these forests for which Bates's description could remain unchanged.

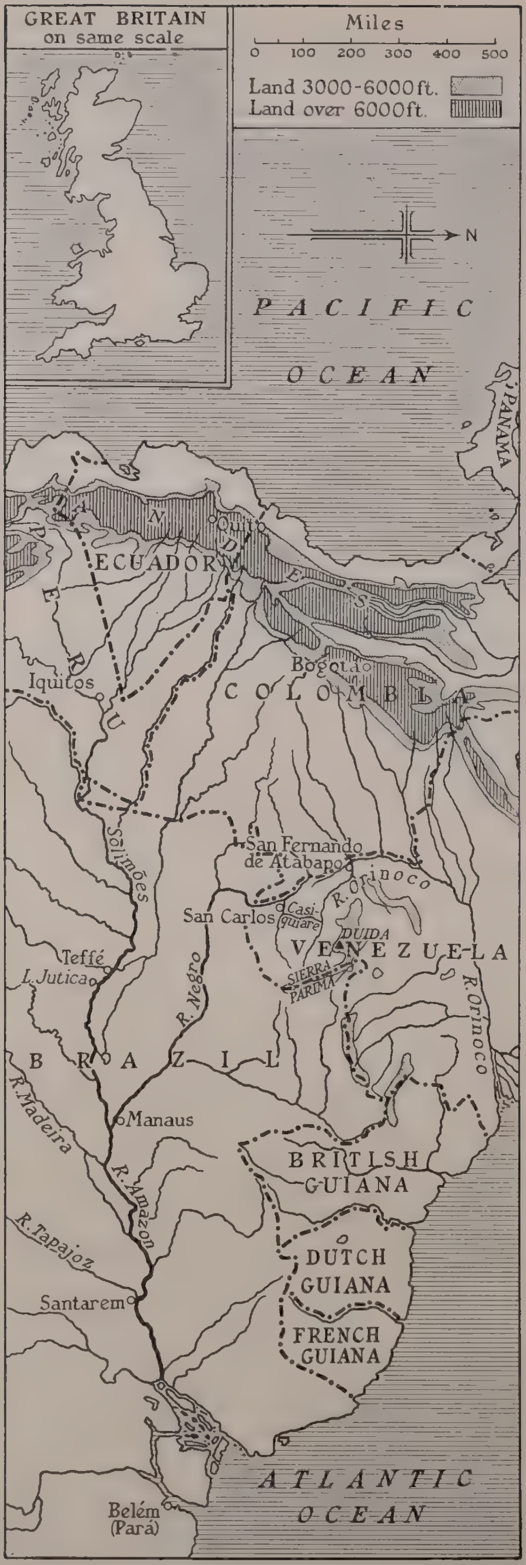
Alfred Russell Wallace was an early friend of Darwin from whom he later parted company. His own ideas on the origin of species first came to him in his lonely meditations in the Amazonian forests and were later matured in the East Indies. The whole discussion of evolution boiled up to a ferment when a joint communication of Wallace's and Darwin's ideas was made to the Linnean Society on July 1, 1858. Wallace has left an interesting general account of his journeys in South America.

But I must part company with these giants, for it is of Richard Spruce that I desire mainly to write. He sailed for Pará on June 7, 1849, and spent nearly fifteen years in different parts of tropical South America, including the eastern and Pacific slopes of the Peruvian and Ecuadorian Andes. The rest of his life—he completed his seventy-fifth year—was passed in semi-retirement in England, dogged by ill-health, occupied by the study of his material, and encouraged by a civil list pension of the princely sum of £50 per annum. He was a botanist and his work on the *Hepaticae* of the Amazon and Andes alone contains descriptions of 700 species and varieties in 43 genera. Of these 700 nearly 500 were collected by himself and more than 400 were new to the science of botany.

It is one of the less amiable peculiarities of mankind to forget their benefactors. Spruce's studies contributed to benefits which have enriched the whole of the civilized world. Everyone knows the part that has been played by quinine in combating malaria. The only source of quinine is cinchona, or Jesuit's Bark, a tree which grows on the moist Amazonian slopes of the Andes. Its medicinal value does not seem to have been known to the Indians of the Inca Empire, and the story that it was introduced into Europe by the Countess of Chinchon, wife of the Viceroy of Peru, has only recently been disproved. The lady died at Cartagena in Colombia on her way back to Spain, and incidentally, not of malaria.

Nevertheless, its value became known in Europe in the early 17th century, and the tree was so ruthlessly exploited that something had to be done about it. This led to plans for plantation development and in 1859 Spruce began to study it carefully and collect seeds. His 'Notes' give a lively impression of the wasteful way in which the wild tree had been exploited. The next year, Sir Clements Markham visited Peru and gave a further impulse to the investigations. Markham was already shaping as a distinguished explorer and geographer. Later he directed the first *Geographical Magazine*, afterwards merged in the Proceedings of the Royal Geographical Society, and was President of the Society for twelve years. He put all his energy into the quinine project, though it was not, in fact, until some years after his visit to Peru that a pound of seed of sufficiently high quinine content arrived in Java.

But Spruce's studies covered a wide range. He was also very interested in rubber, and



A. J. Thornton

his work on the growth and properties of the different types of rubber tree ultimately facilitated the establishment of that vast industry so indispensable to the peace and the wars of modern nations.

In his explorations of the interior of South America, Spruce was particularly concerned with the north-west Amazon Basin, perhaps the least explored area of these forests. It contains one feature of great geographical interest, the Casiquiare Canal. This waterway, 227 miles long, flows out of the upper Orinoco, which rises in the Sierra Parima on the frontier of Brazil and Venezuela, into the upper River Negro, thus carrying down about two-fifths of the waters of the upper Orinoco into the Amazon. In effect, the Amazon and the Orinoco are a pair of fluvial Siamese twins. The River Negro itself is not to be despised as rivers go, which is usually, but not invariably, down to the sea. At one point, it is some twenty-five to thirty miles wide.

I will try and give a rough general idea of this strange region which has changed little since Spruce's day. On a still evening the murky and sluggish waters of the Negro reflect the glow of the sun like the polished surface of a burnished shield. All around may be water even in the heart of a continent, and perhaps the distant view will only be interrupted by the thin shore of a riverine island raised by a misty mirage above the glaze and heat of the level horizon. The silence is broken by the occasional rising of a fish, or the more ebullient dive of the dolphin. Of man there may be no trace.

The forests of the Negro are sombre and forbidding. They do not contain such thick and valuable stands of wild rubber as do, for example, those of the Acre or the Madeira. The region is relatively rich in balata which has long constituted one of the principal wild products. Balata is a hard rubberoid material resembling gutta-percha and possessing some important industrial uses. Machine belting, for example, is usually made of it. Along the banks the trees are fairly uniform in height; there are few giants, although there are always some. But what creates an indescribable sense of haunting sadness is the realization that the whole region was once more prosperous than it is today. Indeed, when Humboldt at the beginning of the 19th century travelled on the upper River Negro, the Orinoco and the Casiquiare, the incipient civilization was already in decay. Even San Fernando de Atabapo, the central point of the upper Orinoco, which had 2000 people in 1908 and 500 in

From Paul Marcroy's "A Journey across South America" (Blackie & Son, Ltd.)

Moonlight on Jutica, a small lake below the Amazon south-east of Teffé. The water having overflowed, a considerable margin of forest is flooded and travellers must sleep in boats or hammocks

1913, had only 150 in 1940. The missions of the 18th century have long since fallen upon evil days; the Indians have dispersed; and the diseases of civilization have penetrated these remote zones. Schomburgk in 1835 formed the same impression and it was shared by Spruce.

Spruce had many adventures in these parts, and much ill-health. They are recorded without any attempt at exaggeration or embellishment in his *Notes of a Botanist on the Amazon and in the Andes.* Even today, with all the resources of modern technology, one is struck by the intense difficulty of conquering nature in these remote parts. On the upper Orinoco Spruce found that civilization had made very slow progress. He comments, for example, on Esmeralda. This hamlet is situated a few miles from the bifurcation of the Orinoco and the Casiquiare and is in a strategic position. It was founded as a mission in the 18th century. Humboldt, at the beginning of the 19th, found twelve to fifteen families in it. Spruce says that, in his time, it consisted of six houses. Some twenty years ago, I encountered two families living there, and in spite of careful enquiry, I have heard of no substantial improvement since. Yet the geographical situation is picturesque, and indeed splendid. Spruce thought it was the most magnificent site he had seen in South America. The forest gives way here to extensive grassy savannahs, dotted with groups of the stately moriche palm. Granite blocks are piled in fantastic heaps on the surface of the plain, and always in the background, after the long journey through the alluvial valleys, stands the lofty mountain of Duida, some 8000 feet high, with its vertical walls of rock.

The truth is that the whole of this region, that is the upper Orinoco and the Casiquiare, is rendered intolerable by the unceasing plague of mosquitoes, sandflies and blood-sucking insects of all kinds. These hardy barbarians make no distinction between day and night, summer and winter, wet and dry seasons. Humboldt, and every traveller since

From Richard Spruce's "Notes of a Botanist" (Macmillan & Co., Ltd.)

(Above) *Cerro Duida (8000 feet), Venezuela, as drawn by Spruce; here the forest gives way to vast savannahs*
(Below) *A small Amazon village near Iquitos; many present-day riverside houses are very similar in appearanc*

From Paul Marcroy's "A Journey across South America" (Blackie & Son, Ltd.)

The first steam-boat on the Amazon filled the inhabitants of the jungle with awed amazement. Much has changed since that time. The forests remain the same but not so man and his instruments. River steamers are now either screw-driven, or, in the upper reaches, stern-wheelers. The Indian tribes are much reduced in number; a few still live in primitive conditions and have little contact with civilization, but these are not seen on the banks of the great rivers

From Paul Marcroy's "A Journey across South America" (Blackie & Son, Ltd.)

him, has commented on these pests in vivid and sometimes unparliamentary language. Here is a vast enterprise to be tackled—the cleaning-up of these superficially attractive but physically trying zones.

Here is a description from one of Spruce's letters to his friend John Teasdale:

> You will credit me when I say that to the sight Esmeralda is a Paradise—in reality it is an inferno, scarcely habitable by man. When I stood in the middle of a small square, round which are built the houses of Esmeralda—the straw doors all carefully closed and looking as if nothing human ever came forth from them—the warm east wind fanning my face and raising the sand in the plaza, but bringing no sound of life on its wings—no bird or even butterfly to be seen—amid the luxuriance of vegetable life, animal life almost extinct—I thought the scene inexpressibly mournful. But the utter absence of living things was only apparent, not real. If I passed my hand across my face I brought it away covered with blood and with the crushed bodies of gorged mosquitoes. In this you have the key to explain the unearthly silence. The apparently tenantless houses had all inhabitants in them who, bat-like, browse away the day, and only steal forth in the grey of morn and evening to seek scanty subsistence. Throughout the day the very air may be said to be alive with mosquitoes, from which even with closed doors one can only imperfectly escape. I constantly returned from my walks with my hands, feet, neck and face covered with blood, and I found that I could nowhere escape these pests. If I climbed the cerros, or buried myself in the forest, or sought the centre of the savannahs, it

From H. W. Bates' "The Naturalist on the Amazons" (J. M. Dent & Sons, Ltd.)

Bates, the Amazonian explorer, having shot a toucan, was attacked by a colony of them. Single toucans, or twos and threes, are common in the forests, but they rarely appear in large numbers

By courtesy of the British Museum (*Natural History*)

(Left) *The cinchona plant* (*source of quinine*), *which is found on the forested slopes of the Andes.* (Right) Hevea Braziliensis, *best known of the rubber trees, grows extensively in Amazonian forests*

> was the same, but it was worst of all on the river. At San Carlos they were often bad enough; in ascending the Casiquiare every day brings an increase of mosquitoes, until, towards the upper mouth and out on the Orinoco, they are an indescribable annoyance.

Such were the conditions in which Spruce passed his years of patient research. Much of his work, no doubt, was soon forgotten, but in the latter half of the 19th century Sir Clements Markham entrusted to one James Collins the assembling of the existing information on the *Hevea Braziliensis* and other varieties of rubber tree, and Collins drew to a very large extent on the material collected by Spruce. The first seeds brought from Brazil to India died, and in 1873 Sir James Hooker at Kew Gardens took up the matter with Henry A. Wickham, a picturesque character who, henceforth, played a prominent part in the centre of the rubber stage.

Wickham had first come out to the American tropics in 1866. Later he made his way up the Orinoco from Trinidad, having no other ambition than to establish himself as a rubber planter. He has left a volume of these travels of no great value in itself, and undistinguished by any particular powers of observation or analysis. He travelled in those same parts of the upper Orinoco which Spruce visited, but the climate proved too much for him and in 1874 he moved with his rubber over to the River Negro and so down to Pará. Shortly afterwards he established himself at Santarem and began his correspondence with Hooker.

The end of it was that Wickham offered to raise Hevea seedlings, as seeds lose their germinating power quickly. He named $50 a thousand as the price and the India Office accepted it. His first consignment in 1875 was a failure. But Wickham was undaunted. He decided to make a bold stroke. About that time there had arrived on the river the first ship of a new Liverpool-Amazon service. Wickham had hardly a cent to bless himself with, but he convinced Captain Murray that it was to both their advantages to allow him to charter the ship on behalf of the Government of India. He then dashed away to a rich Hevea area and returned with his precious cargo in time to meet the ship on the appointed day at the mouth of the river Tapajoz.

His difficulties were not over for he knew that he must pass the Customs House at Belém (Pará) and any considerable delay, not to speak of confiscation, would ruin his priceless freight. His own account of the crucial stage is as follows:

> I had heard of the difficulties encountered in the Clements Markham introduction of the Chinchonas in getting them out of the Montaña of Peru. Any such delay would have rendered my precious freight quite valueless and useless. But again fortune favoured. I had a "friend at Court" in the person of Consul Green. He, quite entering into the spirit of the thing, went himself with me on a special call on the Barão do S . . ., chief of the "Alfandiga", and backed me up as I represented to His Excellency my difficulty and anxiety, being in charge of, and having on board a ship anchored out in the stream, exceedingly delicate botanical specimens specially designated for delivery to Her Britannic Majesty's own Royal Gardens of Kew. Even while doing myself the honour of thus calling on His Excellency, I had given orders to keep up steam, having ventured to trust that His Excellency would see his way to furnish me with immediate despatch. An Interview most polite, full of mutual compliment in best Portuguese manner, enabled us to get under way as soon as Murray had got the dinghy hauled aboard.

Thus Wickham sailed away with the cargo, and in the same year Dr N. A. Otto of Cologne first demonstrated the possibilities of the internal combustion engine for commercial and general purposes.

Wickham was knighted in 1920. He died eight years later at the age of eighty-two. He had luck and he must be given full credit for seeing and seizing the opportunity of the moment. He knew something about rubber at a moment when others wanted to know, and he began to glimpse its commercial possibilities. His achievement brought him success and popularity and he was regarded as an authority on rubber, at least on the Hevea. Most of his theories about rubber development and technique proved to be mistaken, but his vanity and assurance made it hard for him to acknowledge his mistakes. I should not rank him among the great British explorers.

The seeds and seedlings contained in the famous consignment are usually said to have numbered 70,000. In August 1876 some 2000 of them were sent from Kew to Ceylon, and a few to Java and Singapore. From these modest beginnings, with certain other very small consignments, brought by Robert Cross, has grown the great rubber industry of the East. This is no place to trace that story. For a long time it was doubtful whether any progress would be achieved, but at the turn of the century, precisely in 1900, world trade statistics reported the export of four tons of Eastern plantation rubber.

Nor is it possible to review the melancholy history of the exploitation of rubber, mainly wild, in the Amazon basin. By 1903 the region was exporting more than 30,000 tons annually. In 1910 world exports from all producing regions touched the record figure of 85,000 tons, and over half of this came from Amazonia. In 1912, a peak year, the Amazon export was 44,000 tons. Over eighty per cent of this was the coagulated latex of the wild Hevea, and of this some sixty per cent was graded as "fine hard para", the highest-priced rubber known in the world. But the jungle boom of the early years of this century did not last long. Indeed by 1916 it had already collapsed. The plantation product of the East had by then begun to capture the world's market, and for many years now the production of the Amazon has been an insignificant percentage. It reached the lowest point in 1932, when just over 6500 tons were produced.

Amazonia has never really recovered. The plantation enterprise of Henry Ford on the Tapajoz has not made an impact on the region as a whole, and is to be discontinued. During the recent war the attention of the United States was directed to the area owing to the loss of the plantations in Malaya and the Dutch East Indies. Agreement was reached with the Brazilian Government, and the Rubber Development Corporation was formed and is said to have spent some $60,000,000 during the three years it was operating at strength. But apparently the results were disappointing. Once more, only the edges of the jungle have been scraped.